Integration Document

Promass 83 Flowmeter via PROFIBUS PA to the PlantPAx Process Automation System

Using a 1788-EN2PAR Linking Device

Topic	Page
Preferred Integration	2
Application Overview	4
Promass 83 Flowmeter	6
Example System	10
Installation and Configuration	11
Visualization	77
Additional Resources	83

Endress+Hauser
People for Process Automation

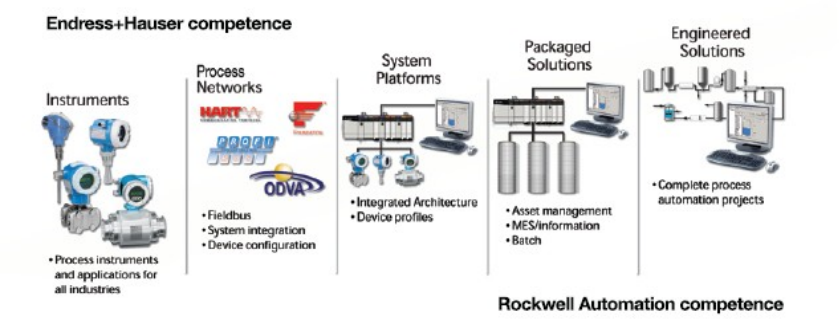
Allen-Bradley • Rockwell Software

Rockwell Automation

Preferred Integration

Rockwell Automation and Endress+Hauser have strengthened their strategic alliance to provide complete process automation solutions that use best-in-class instrumentation, software, and control systems.

There are hundreds of different components in a typical plant: controllers, remote I/O, electrical drives, safety equipment, and sensors. Each must be integrated, configured, and optimized during start-up and operation. Recognizing the challenges this creates, Rockwell Automation and Endress+Hauser are focused on providing you with scalable, off-the-shelf solutions.



To supply robust system solutions, Rockwell Automation pre-tests many third-party manufactured HART, FOUNDATION Fieldbus, and PROFIBUS PA field devices in the system test laboratory for compatibility with the Rockwell Automation PlantPAx process automation system. Each field device is connected to the PlantPAx system and is subjected to interoperability testing procedures similar to operating procedures in your plant. The results of each field test are recorded in a test report for integration planning purposes.

For Endress+Hauser field devices, an additional step provides an "Integration Document" and "Interoperability Statement" for each tested instrument. The Integration Document provides information on installation, configuration, startup, and operation of the integrated system. The Interoperability Statement is assurance that the Endress+Hauser field device meets PlantPAx system interoperability performance measures, as jointly established by Rockwell Automation and Endress+Hauser and verified through completion of common test procedures performed by either company. Both the Integration Document and Interoperability Statement help reduce risk with ease of integration.

The overall mission of the alliance is to provide you with proven solutions that combine field instrumentation with fieldbus networks, such as HART, FOUNDATION Fieldbus, and PROFIBUS PA networks, with asset management capabilities and Rockwell Automation's system capabilities to provide a total engineered solution.

Through preferred integration and support of increasing requirements for plant-wide control, the alliance offers the following benefits:

- Reduced integration costs throughout engineering, commissioning, and start-up
- Optimized plant availability and output
- Ensured product quality and consistency
- Optimized traceability to meet regulatory demands
- Predictive maintenance through intelligent instruments

For new construction, process improvements at an existing plant, or operating cost reductions, the alliance delivers the following:

- Preferred integration reduces risk, reduces integration costs, and protects investment with pre-engineered interoperability. Both companies believe open systems and standardized interfaces bring maximum benefits.
- Advanced diagnostics with plant-wide control provides better visibility of plant health and easier access to instrument diagnostics, which ultimately leads to faster troubleshooting and improves decision-making.
- Collaborative lifecycle management leads to improvements in design, engineering, and startup and support of plants. This collaboration increases productivity, manages information about instrumentation assets, optimizes plant assets, and results in a complete lifecycle management solution.

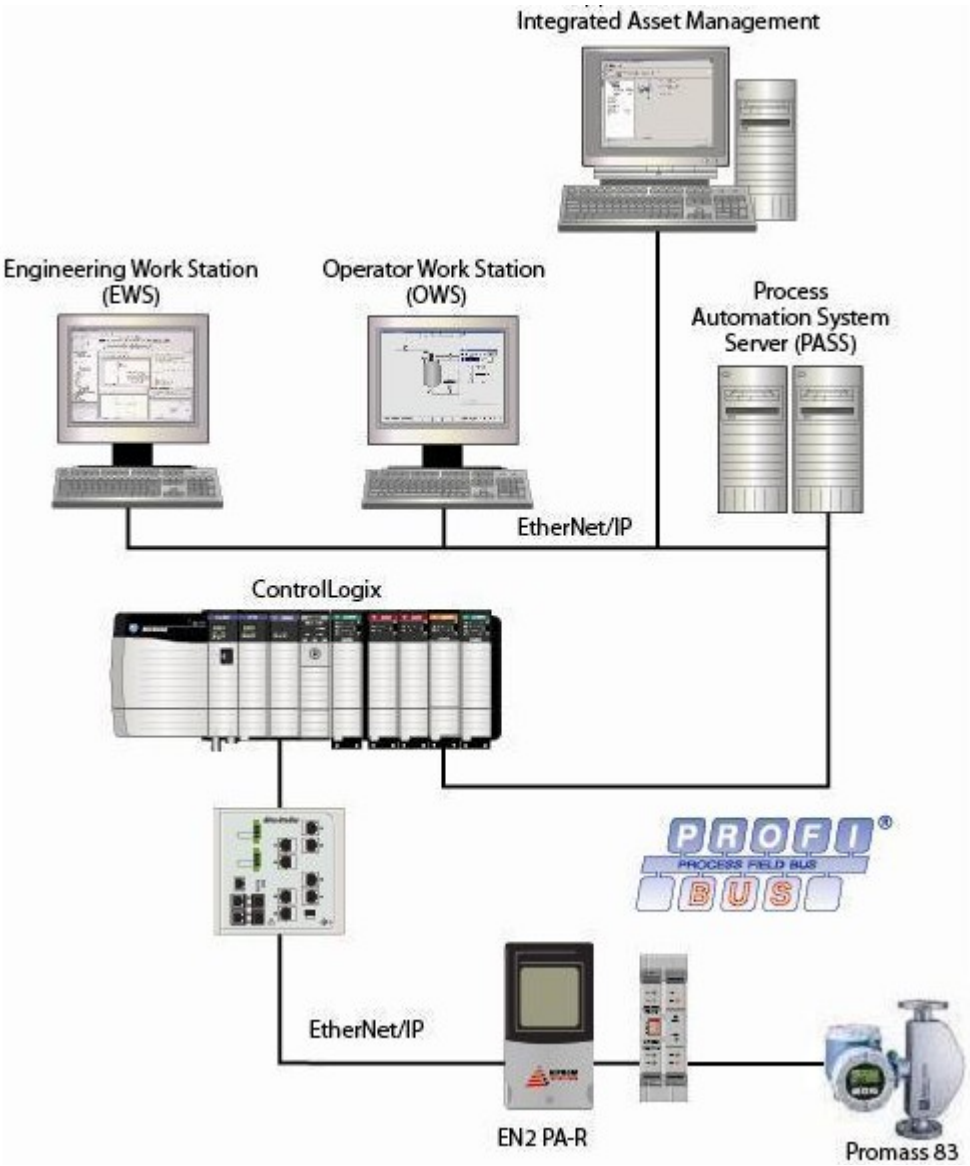
PlantPAx
Process Automation System

Application Overview

This document provides a step-by-step approach to integrating an Endress+Hauser Promass 83 Coriolis mass flowmeter via PROFIBUS PA into a Rockwell Automation PlantPAx process automation system.

This Section	Describes
Application overview	Details about the field instrument and control system.
System details	Specifications on the required hardware and software components.
Installation	How to install and connect the instrument, linking device and other components.
Configuration	How to: • Configure theEN2PAR linking device. • Configure the measurement instrument.
Visualization	How to implement and configure a graphical display of device information.

The ControlLogix platform provides a robust EtherNet/IP backbone for communication to process fieldbus networks. The PlantPAx architecture uses producer/consumer technology, allowing input information and output status to be shared by all ControlLogix controllers in the system.



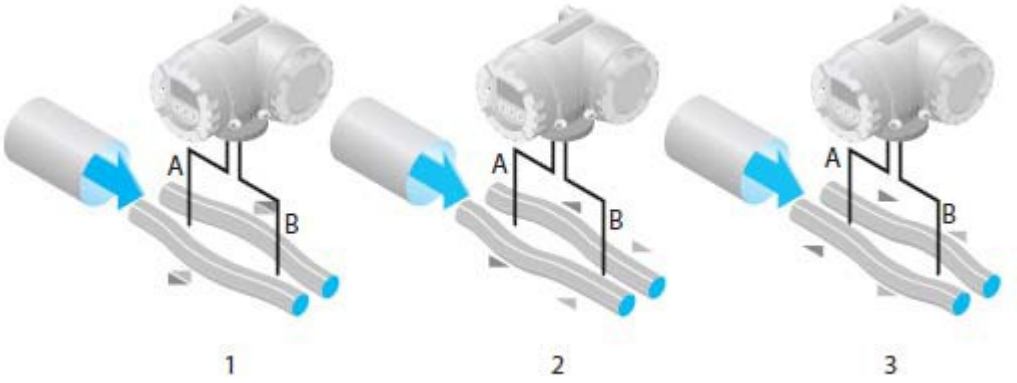
This integration document assumes you have a working knowledge of ControlLogix systems. For more details regarding the equipment and tasks described in this document, see Additional Resources.

Promass Flowmeter

Promass measuring instruments make it possible to simultaneously record several process variables (mass/density/temperature) for various process conditions during measuring operation. Promass sensors, tried and tested in over 100,000 applications, offer the following:

- Multivariable flow measurement in compact design
- Insensitivity to vibrations thanks to balanced two-tube measuring system
- Immunity from external piping forces due to robust design
- Easy installation without taking inlet and outlet runs into consideration

The measuring principle is based on the controlled generation of Coriolis forces. In the sensor, two parallel measuring tubes containing flowing fluid oscillate in antiphase, acting like a tuning fork. The Coriolis forces produced at the measuring tubes cause a phase shift in the tube oscillations. At zero flow, in other words when the fluid is at a standstill, the two tubes oscillate in phase (1). Mass flow causes deceleration of the oscillation at the inlet of the tubes (2) and acceleration at the outlet (3).



The phase difference (A-B) increases with increasing mass flow. Electrodynamic sensors register the tube oscillations at the inlet and outlet. System balance is ensured by the antiphase oscillation of the two measuring tubes. The measuring principle operates independently of temperature, pressure, viscosity, conductivity, and flow profile.

Measured Variables

- Mass flow (proportional to the phase difference between two sensors mounted on the measuring tube to register a phase shift in the oscillation)
- Volume flow (calculated from mass flow and fluid density. The density is proportional to the resonance frequency of the measuring tubes.)
- Measuring tube temperature (by temperature sensors) for calculatory compensation of temperature effects
- Density by monitoring the tube frequency is directly proportional to medium density
- Totalized flow (application dependent using pulse output)

Signals from Instruments to Control System

PROFIBUS PA Interface

- PROFIBUS PA in accordance with EN 50170 Volume 2, IEC 61158-2 (MBP), galvanically isolated
- Verify data transmission rate: 31.25 kbit/s
- Current consumption: 11 mA
- Permitted supply voltage: 9 to 32 V
- Bus connection with integrated reverse polarity protection
- Error current FDE (Fault Disconnection Electronic): 0 mA
- Signal encoding: Manchester II
- Function blocks: 6 x analog input, 3 x totalizer
- Input data: positive zero return (ON/OFF), zero point adjustment, measuring mode, totalizer control
- Output data: mass flow, volume flow, corrected volume flow, density, reference density, temperature, totalizers 1 to 3
- Bus address can be configured via hardware, miniature switches, or via software, local display (optional)

Configuration of the Analog Input function blocks 1 to 6:

Measured variable	ID for CHANNEL function
MASS FLOW (factory setting AI function block 1)	277
VOLUME FLOW (factory setting AI function block 2)	273
CORRECTED VOLUME FLOW (factory setting AI function block 3)	398
DENSITY (factory setting AI function block 4)	281
REFERENCE DENSITY (factory setting AI function block 5)	402
TEMPERATURE (factory setting AI function block 6)	285
The following measured variables are available when the additional "concentration measurement" software is installed (order option)	
TARGET MASS FLOW	1164
% TARGET MASS FLOW	1165
TARGET VOLUME FLOW	1167
% TARGET VOLUME FLOW	1168
TARGET CORRECTED VOLUME FLOW	1169
CARRIER MASS FLOW	1170
% CARRIER MASS FLOW	1171
CARRIER VOLUME FLOW	1172
% CARRIER VOLUME FLOW	1173
CARRIER CORRECTED VOLUME FLOW	1174
% BLACK LIQUOR	1166
°BAUME	1175
°API	
°PLATO	
°BALLING	
°BRIX	
FLEXIBLE	
The following measured variables are available when the additional "viscosity" software is installed (order option)	
DYN. VISCOSITY	1177
KIN. VISCOSITY	1178
T. COMP. DYN. VISCOSITY	1179
T. COMP. KIN. VISCOSITY	1180

Measured variable	ID for CHANNEL function
The following measured variables are available when the additional "advanced diagnostics" software is installed (order option)	
MASS FLOW DEVIATION	1603
DENSITY DEVIATION	1620
REFERENCE DENSITY DEVIATION	1637
TEMPERATURE DEVIATION	1654
TUBE DAMPING DEVIATION	1671
ACTUAL DEVIATION ELECTR. DYN. SENSORS	1688
TUBE DAMPING FLUCTUATION DEVIATION	2055
TUBE DAMPING FLUCTUATION DEVIATION	2072
Note! If, when performing the PROFIBUS network configuration, the AI module was integrated in slot 1 to 6, the measured variable selected in the CHANNEL function for the respective Analog Input function block 1 to 6 is transmitted cyclically to the PROFIBUS master (Class 1) → 93.	

Configuration of totalizers 1 to 3:

Totalizer value/measured variable	ID for CHANNEL function
MASS FLOW (factory setting totalizers 1 to 3)	277
VOLUME FLOW	273
CORRECTED VOLUME FLOW	398
OFF	0
The following measured variables are available when the additional "concentration measurement" software is installed (order option)	
TARGET MASS FLOW	1164
TARGET VOLUME FLOW	1167
TARGET CORRECTED VOLUME FLOW	1169
CARRIER MASS FLOW	1170
CARRIER VOLUME FLOW	1172
CARRIER CORRECTED VOLUME FLOW	1174
Note! If, when performing the PROFIBUS network configuration, the module or the function TOTAL was integrated in slot 7, 8 or 9, the measured variable selected in the CHANNEL function for the totalizers 1 to 3 is transmitted cyclically to the PROFIBUS master (Class 1) → 95.	

Control System

The control system includes these components:

Component	Description
Controller	The ControlLogix controller is a modular, high performance controller, that uses RSLogix 5000 programming software to configure, program, and monitor a system.
PROFIBUS PA linking device	The 1788-EN2PAR is a PROFIBUS PA master linking an EtherNet/IP network to a PROFIBUS PA field device network capable of supporting process instrumentation. It is a true PA master linking directly to the PA network with built in PA power conditioners. The EN2PAR and PA field devices are added directly into the RSLogix 5000 IO tree. The EN2PAR supports FDT (Field Device Type) / DTM (Device Type Manager) technology. The 1788-EN2PAR provide a fast and integrated solution for adding Profibus PA field devices to any Logix platform. This linking device provides a direct link between Profibus PA and EtherNet/IP with no intermediate Profibus-DP layer required. The module supports a maximum of 24 field devices and can supply a 500mA per trunk. It will also allow the user to view detailed diagnostics from each field device using its DTM (device type manager) directly from the Logix environment with Hiprom's FDT-ThinFrame. The user will be able to view a scope trace of the signal of each field device and provide extended statistics with regards to packet count (send, received, class 1, class2 etc.)

Component	Description
Programming software	RSLogix 5000 is the software tool used to create the configuration that will be stored in the Logix controller and the EN2PAR and provide access to cyclic data to and from each field device. The AOP in RSLogix5000 is able to configure each instrument on the network, transfer the configuration to the Logix controller and PA master which interpret the instrument specific data structures.
Visualization software	FactoryTalk View Site Edition software is an HMI software program for monitoring, controlling, and acquiring data from manufacturing operations throughout an enterprise. A generic display provides a graphical representation via faceplates of the field instrument connected to the EN2PAR linking device.
Asset management software	**FactoryTalk AssetCentre**, with a fully scalable design, provides a set of asset-centric focused tools for securely and centrally managing factory and process automation production environments. It secures access to the control system, tracks users' actions, managing asset configuration files, configuring process instruments, and provides backup and recovery of operating asset configurations. • Change management - management of security, configuration and archiving of control assets. • Process device management - calibration and configuration for process instrumentation. • Condition monitoring - predict or prevent impending failures of process instrumentation with centralized device information. • Disaster recovery - for all assets and devices. FactoryTalk AssetCentre is based on the open, industry-leading FDT/DTM technology integrated into the PlantPAx process automation system. It is a common environment and launch application for Device Type Manager (DTM). An expanding library of Device DTMs and an array of Communication DTMs are supported. The optional smart device configuration tool **FieldCare** and the Life Cycle Management tool W@M are Endress+Hauser's plant asset management solution. • Easy to implement and to scale up into existing infrastructure. • Entire management of smart field devices supporting Ethernet, HART, PROFIBUS, FOUNDATION Fieldbus and Wireless HART. • Supports the entire device life cycle based on W@M starting with engineering through ordering, installation, configuration, commissioning, calibration, documentation management and spare parts handling. • Endures technology migration by supporting all device DTMs and iDTMs for DD based devices. • Allows communication through third party systems supporting FDT/DTM technology. • Condition monitoring: used for preventive and predictive maintenance based on diagnostic information from field devices. FieldCare enables you to step into the plant asset management world with a sustainable investment and offers the possibility to scale up to an integrated asset management solution.

Example System

Endress+Hauser and Rockwell Automation interoperability testing is performed for every new device and product.

Hardware Components

Component	Catalog Number
Promass 83 Coriolis mass flowmeter	83E08-AAASAAAALAAH
ControlLogix controller	1756-L63 series B
HIPROM 1788-EN2PAR module	1788-EN2PAR
Stratix 8000 Switch	1783-MS10T
Power Supply AB	1606-XLE
HIPROM Junction Box	1788-FBJB6 or FBJB4R
Ethernet Bridge	1756-EN2TR

Software Components

Component	Catalog Number
RSLogix 5000 Enterprise Series programming software, Professional edition Includes: • RSLinx Classic software • RSLinx Enterprise software	9324-RLD700NXENE
FactoryTalk View Site Edition (SE) software	9701-VWSXXXXXENE
FactoryTalk AssetCentre server	9515-ASTSRVRENE
FactoryTalk AssetCentre process device configuration	9515-ASTPRDCFENE
FieldCare Standard Asset Management software (optional) •	SFE551
HIPROM 1788-EN2PAR DTM	
AOP for EN2PAR	

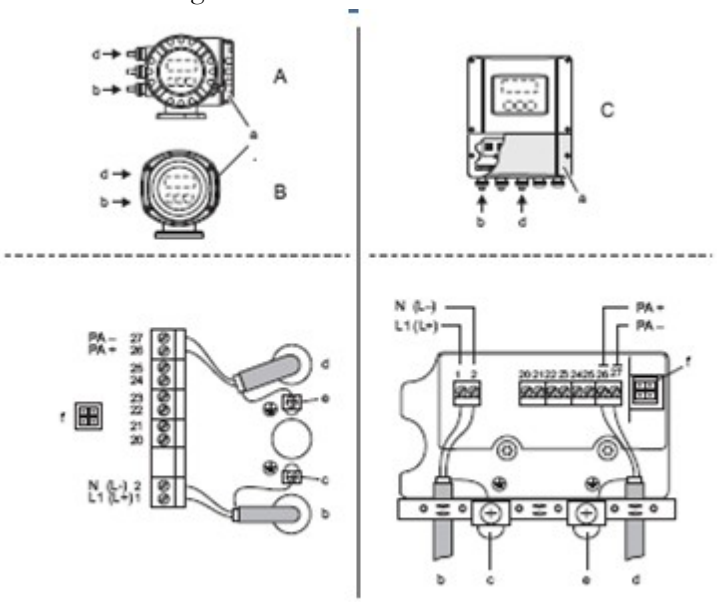
For specifications of the engineering workstation (EWS) and operator workstation (OWS), see the Integrated Architecture for Process Control System Recommendations Manual, publication PROCES-RM001.

Installation & Configuration

The following information is a summary of the installation procedures. See Additional Resources for complete installation instructions, including warnings.

Wire & Connect a Promass 83 Flowmeter

1. Unscrew the connection compartment cover (a) from the transmitter housing.
2. Feed the power supply cable (b) and the fieldbus cable (d) through the appropriate cable entries.
3. Perform wiring in accordance with the respective terminal assignment and the associated wiring diagram.
4. Screw the cover of the connection compartment (a) back onto the transmitter housing.



ATTENTION

Caution: Risk of damaging the fieldbus cable! Observe the information about shielding and grounding the fieldbus cable.

Item	Description
A	View A (field housing)
B	View B (stainless steel field housing)
C	View C (wall-mount housing)

Item	Description
a	Connection compartment cover
b	Cable for power supply: 85 to 260 V AC, 20 to 55 V AC, 16 to 62 V DC Terminal No. 1: L1 for AC, L+ for DC Terminal No. 2: N for AC, L- for DC
c	Ground terminal for protective earth
d	Fieldbus cable: Terminal No. 26: PA+ (with reverse polarity protection) Terminal No. 27: PA- (with reverse polarity protection)
e	Ground terminal for fieldbus cable shield Observe the following: The shielding and grounding of the fieldbus cable - ensure that the stripped and twisted lengths of cable shield to the ground terminal are as short as possible
f	Service adapter for connecting service interface FXA193 (fieldcheck, FieldCare)

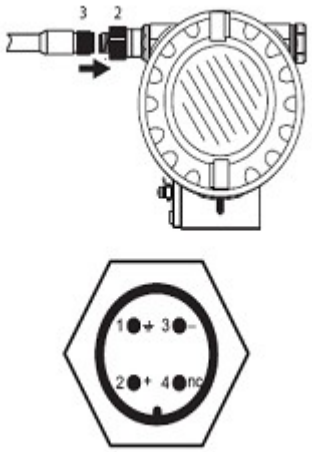
Fieldbus Connector

The connection technology of PROFIBUS PA allows measuring devices to be connected to the fieldbus via uniform mechanical connections, such as T-boxes, distribution modules, etc. This connection technology, which uses prefabricated distribution modules and plug-in connectors, offers substantial advantages over conventional wiring.

- Field devices can be removed, replaced or added at any time during normal operation. Communication is not interrupted.
- Installation and maintenance are significantly easier.
- Existing cable infrastructures can be used and expanded instantly; e.g., when constructing new star distributors using 4-channel or 8-channel distribution modules.

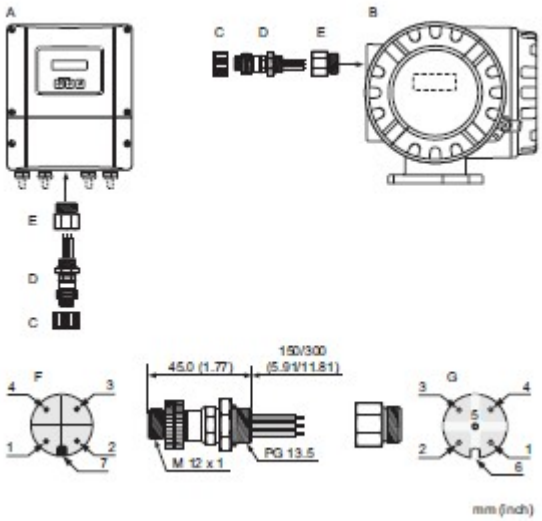
The device can be supplied with the option of a ready-mounted fieldbus connector. Fieldbus connectors for retrofitting can be ordered from Endress+Hauser as a spare part. Please see Endress+Hauser Support and contact your representative.

1. Insert plug (2) into bushing (3).
2. Screw firmly.
3. Ground the device according to the desired safety concept.



Pin	Meaning
1	Ground
2	Signal +
3	Signal -
4	Not connected

Configuring the Device Address



The address must always be configured for a PROFIBUS PA device. The valid device addresses are in the range from 1 to 125. In a PROFIBUS PA network, each address can only be assigned once. If an address is not configured correctly, the device is not recognized by the master. All measuring devices are delivered from the factory with the address 126 and with software addressing.

Addressing via Local Operation/Operating Program

Addressing takes place in the FIELDBUS ADDRESS function (6101). See the Quick Setup menu. For more detailed information see Additional Resources.

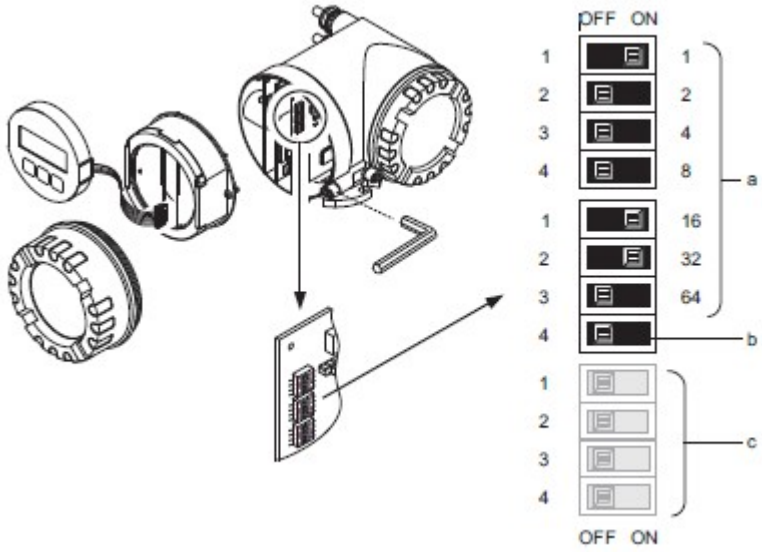
Addressing via Miniature Switches

WARNING

Risk of electric shock. Exposed components carry dangerous voltages. Make sure that the power supply is switched off before you remove the cover of the electronics compartment.

1. Loosen the Allen screw (3 mm) of the securing clamp.
2. Unscrew cover of the electronics compartment from the transmitter housing.
3. Remove the local display (if present) by loosening the set screws of the display module.
4. Set the position of the miniature switches on the I/O board using a sharp pointed object.

5. Installation is the reverse of the removal procedure.



Item	Description
a	Miniature switches for setting the device address (illustrated: 1 + 16 + 32 = device address 49)
b	Miniature switches for the address mode (method of addressing): OFF = software addressing via local operation/operating program (factory setting) ON = hardware addressing via miniature switches
c	Miniature switches not assigned

For this example the first two switches were set to ON for an address of 3.

Wire & Connect a Field Instrument to EN2PAR

The 1788-EN2PAR linking device is designed to operate within the Rockwell Automation PlantPAx system using EtherNet/IP as the communication backbone to the PROFIBUS PA process device network. All power required for the module's operation is derived from an external 24V power supply. For current consumption, please refer to electrical specifications in the EN2PAR user manual.

The current status of the linking device is conveyed to the user by means of the LCD display.

The following information is stored in the EN2PAR and is available to the PlantPAx process automation system.

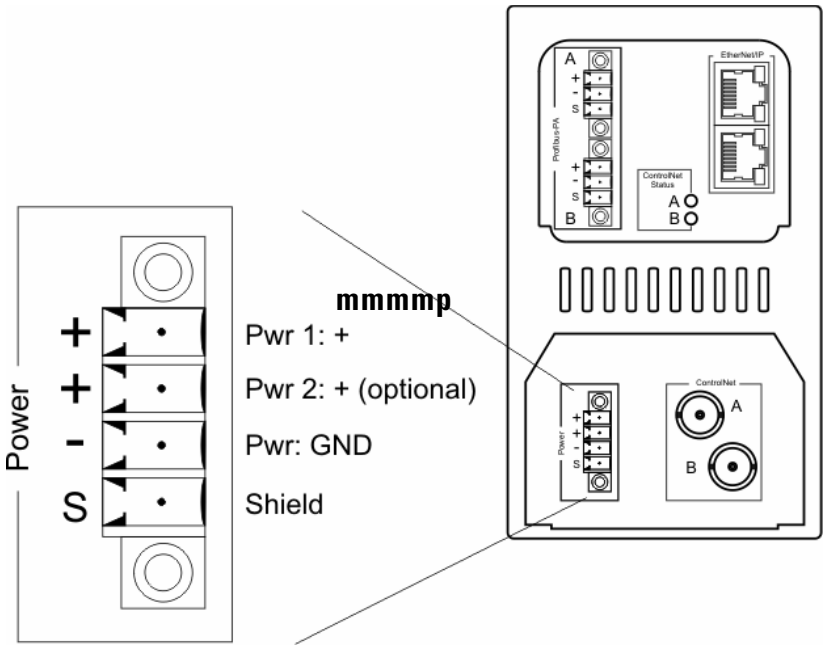
- Eight Input process variables (PVs) and eight Output PVs from up to 24 PROFIBUS PA field devices
- Diagnostics from the 1788-EN2PAR module
- Extended diagnostics of each PROFIBUS field device

The EN2PAR and field devices can be connected through a junction box (complying with IEC61158-2), such as the 1788-FBJB6.

Installation of the EN2PAR

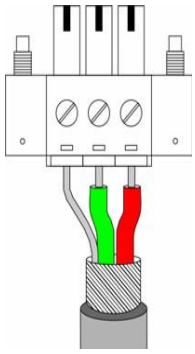
Power

The 1788-EN2PAR requires 9 – 32V input to operate. The user has the option to connect a second power supply (for redundant purposes) to the module. Below is the power supply connection:



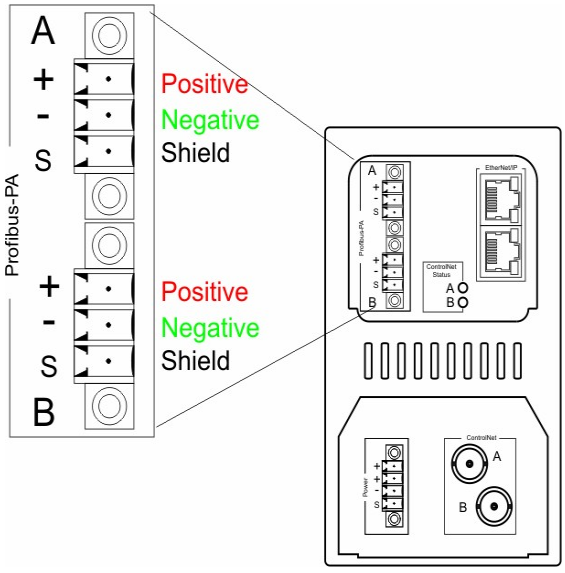
Profibus PA

The Profibus PA network must be connected via the PA terminal on the module. The pin-out is as follows:



Pin	Description
Right	PA +
Middle	PA -
Left	Shield

:

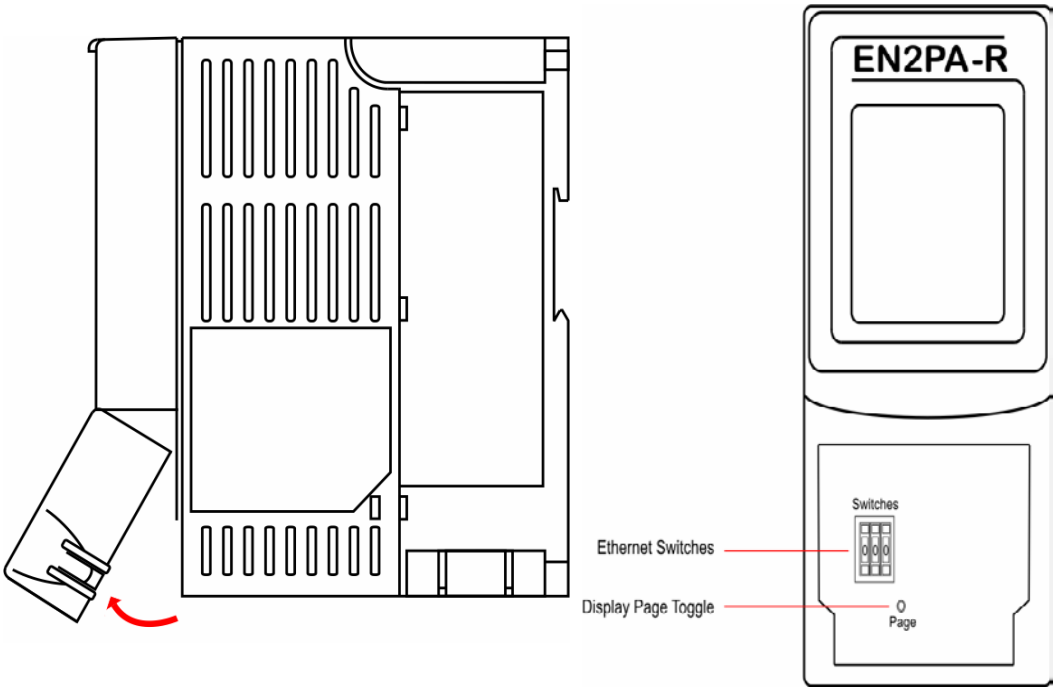


The PA cable color code is used as set in IEC61158-2 Physical Layer Specification.

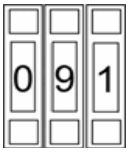
Configure the Linking Device Ethernet Address

The module will connect to an Ethernet network using a RJ45 connector. The module will ship with BOOTP enabled. Thus the user can set the IP address using a BOOTP server or using the hardware switches. The hardware switches is located under the front cover as shown below. The *Page* button is used to toggle between different diagnostics on the display.

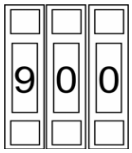
In this application, the Ethernet Port is used to connect the Linking Device to the ControlLogix system using the 1756-EN2TR.



Module will boot with IP address: 192.168.1.091. **Note**: Modify the address if necessary. For this example we used 91.



Module will boot with BOOTP enabled



For normal BOOTP operation the switches must be set to "000".

Software

The user will need the following software to configure and use the 1788-EN2PAR:

- Add-on Profile (AOP)
- 1788-EN2PAR Device Type Manager (DTM)

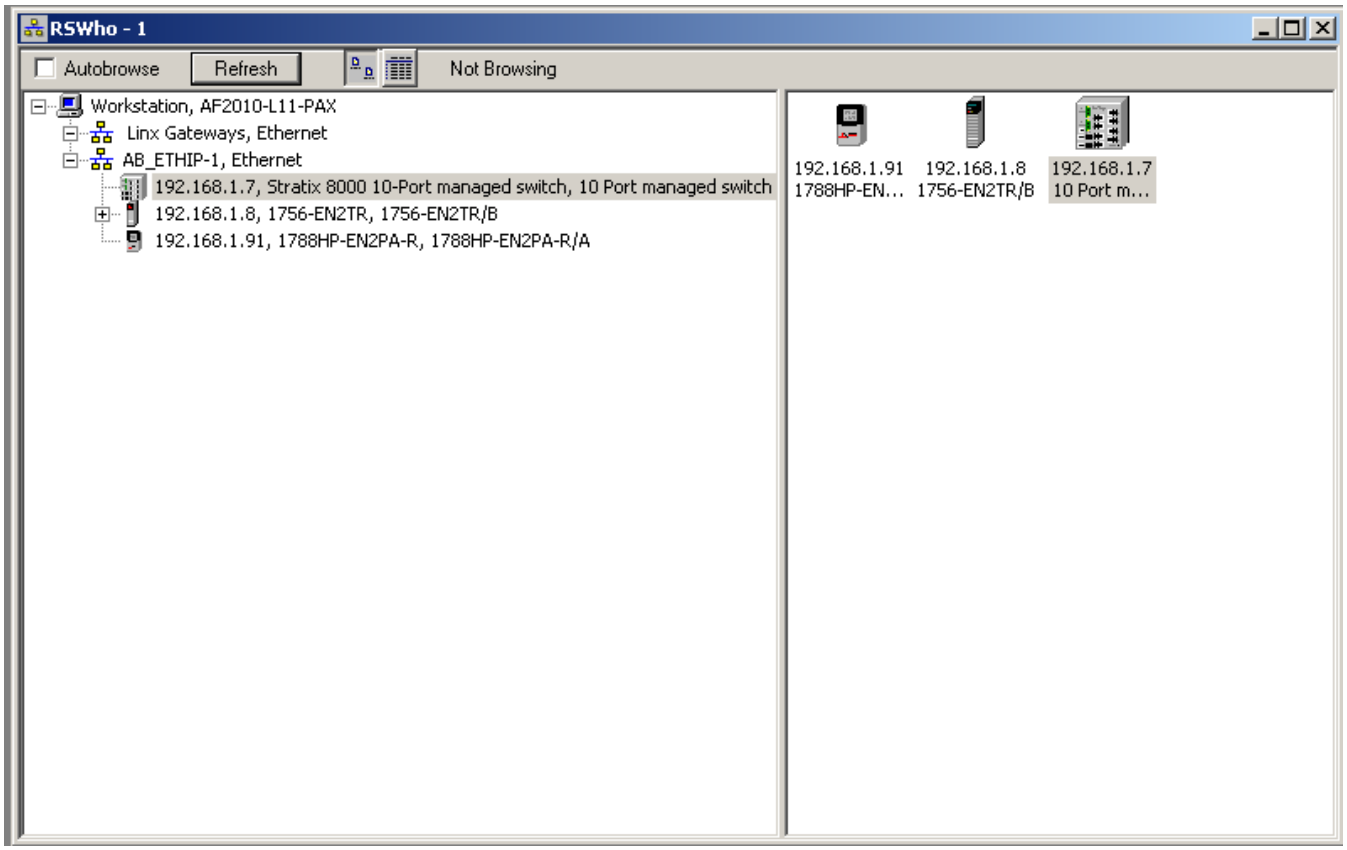
Both the applications can be found on the product CD or the Hiprom Technologies website: www.hiprom.com.

Note: To install the AOP and DTM Go to the Hiprom site and download. Then open RSLogix 5000

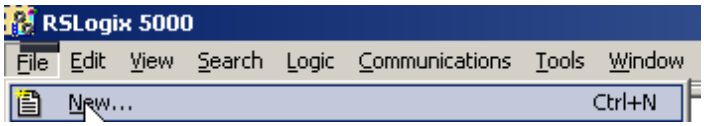
Configuring the System Using RSLogix 5000

The following are the steps required to build a PROFIBUS PA tree in RSLogix 5000.

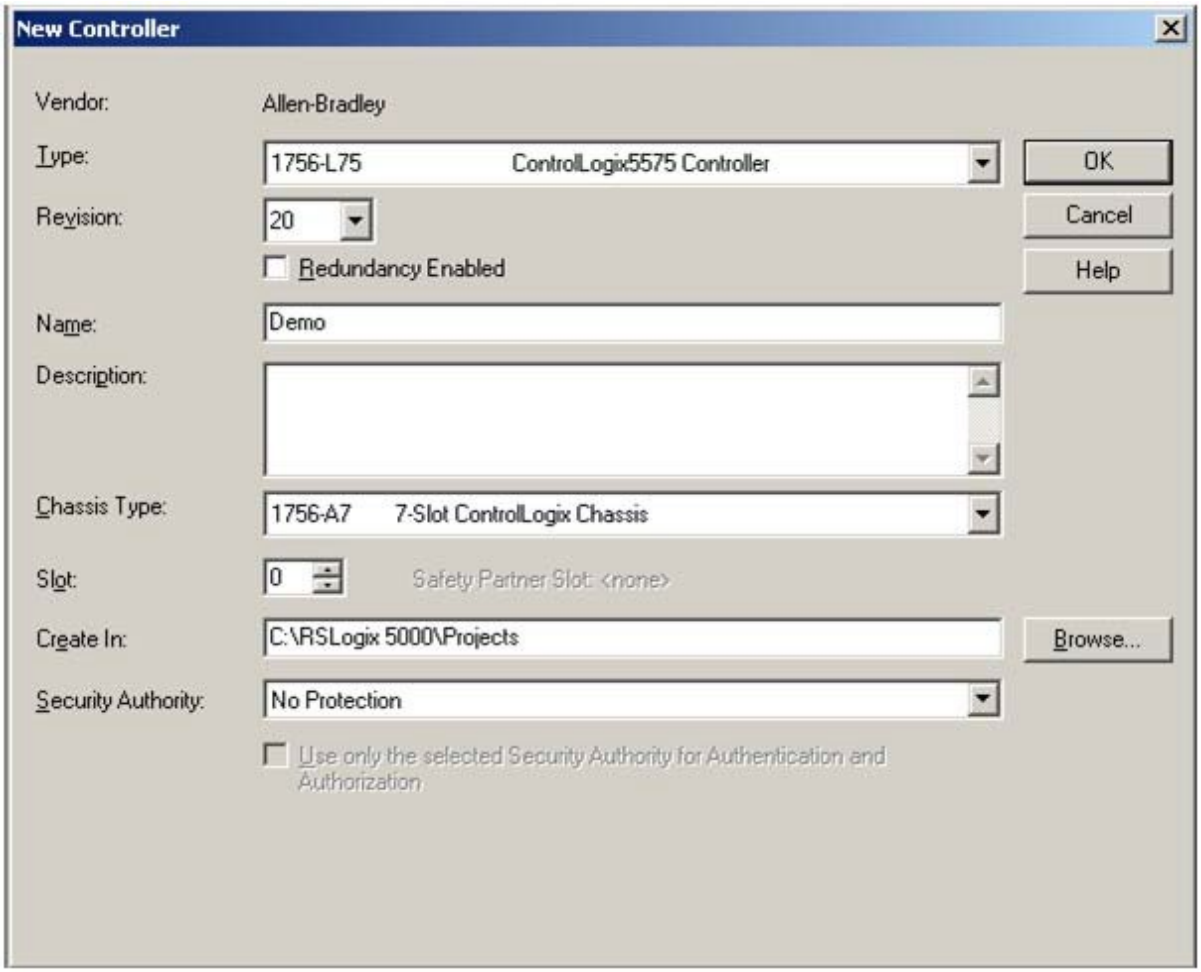
Note: Using RS Who Active in RSLinx or RSLogix to verify the active devices as shown in the example below:



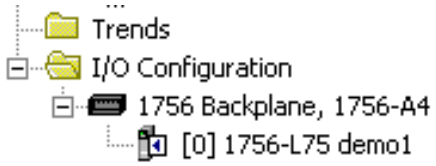
1. Open RSLogix.
2. Select New File to create a new project.



3. Click and the controller screen appears. Select and enter the Data.

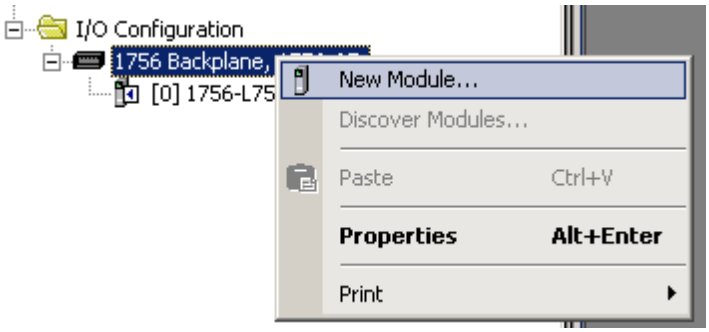


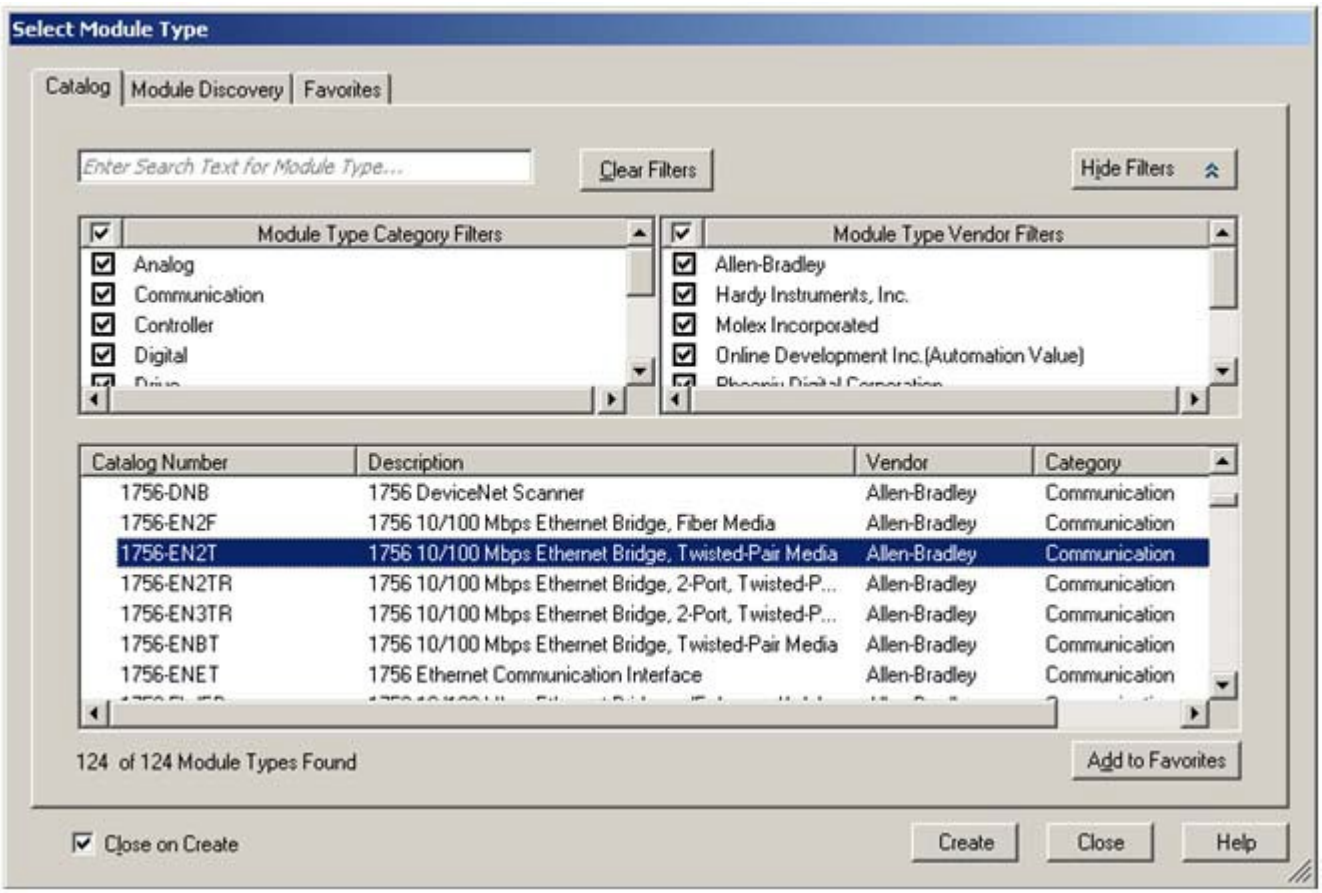
4. Click OK and create an RSLogix project in the I/O configuration.



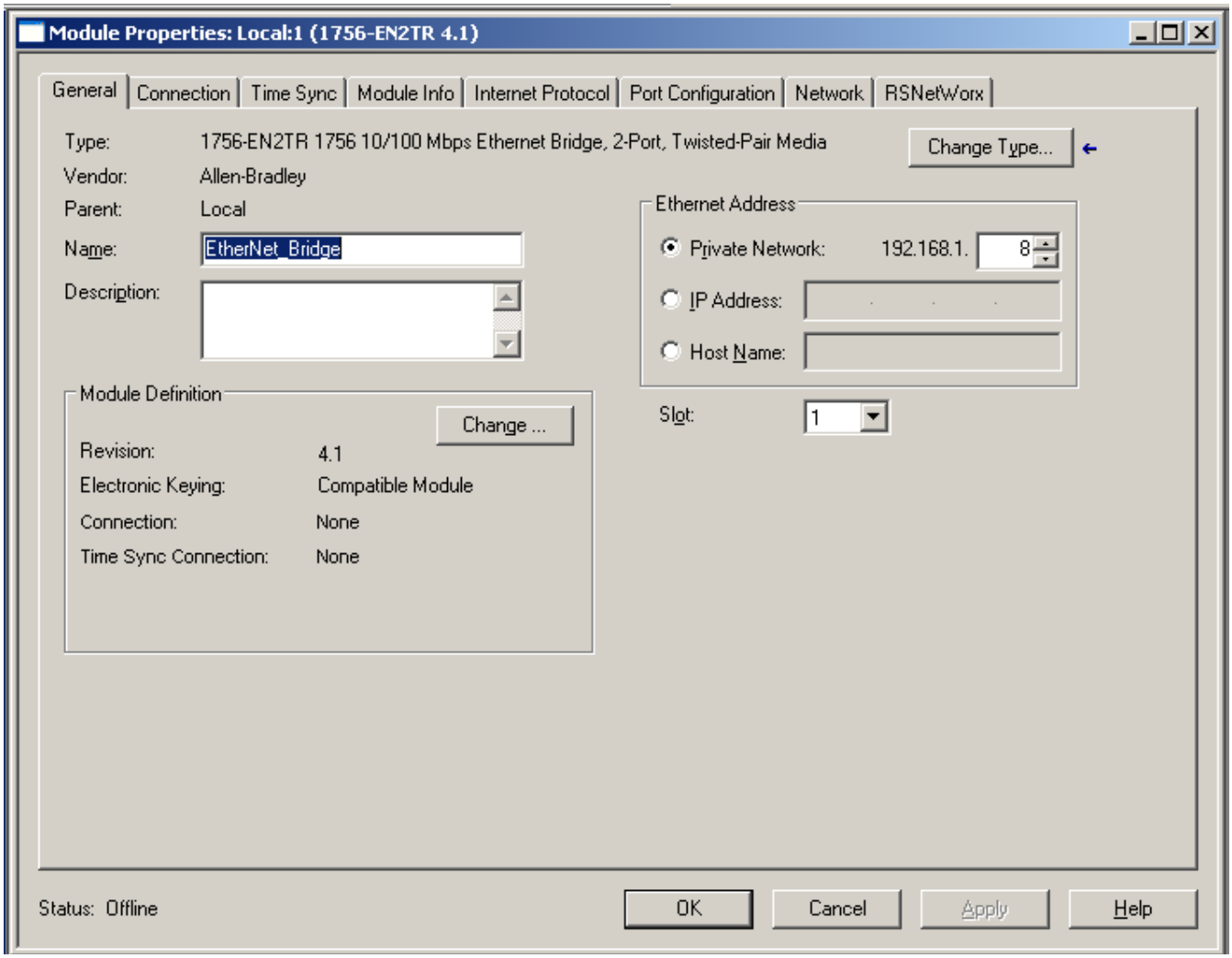
Note: Add the Ethernet Module and 1788-EN2PAR as shown. For this example, the Ethernet address for the EN2T is set to 8 and the EN2PAR to 91.

5. From the I/O tree select New Module, and select and add the EN2T. Click Create. .

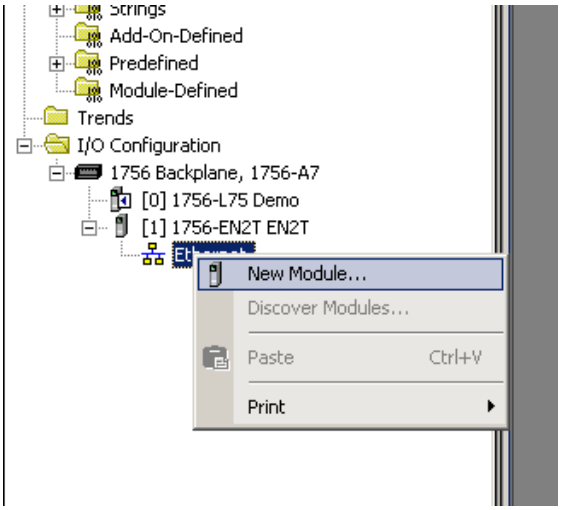




6. Using the I/O configuration utility, select module and add the IP address for the 1756-EN2T to 192.168.1.8.

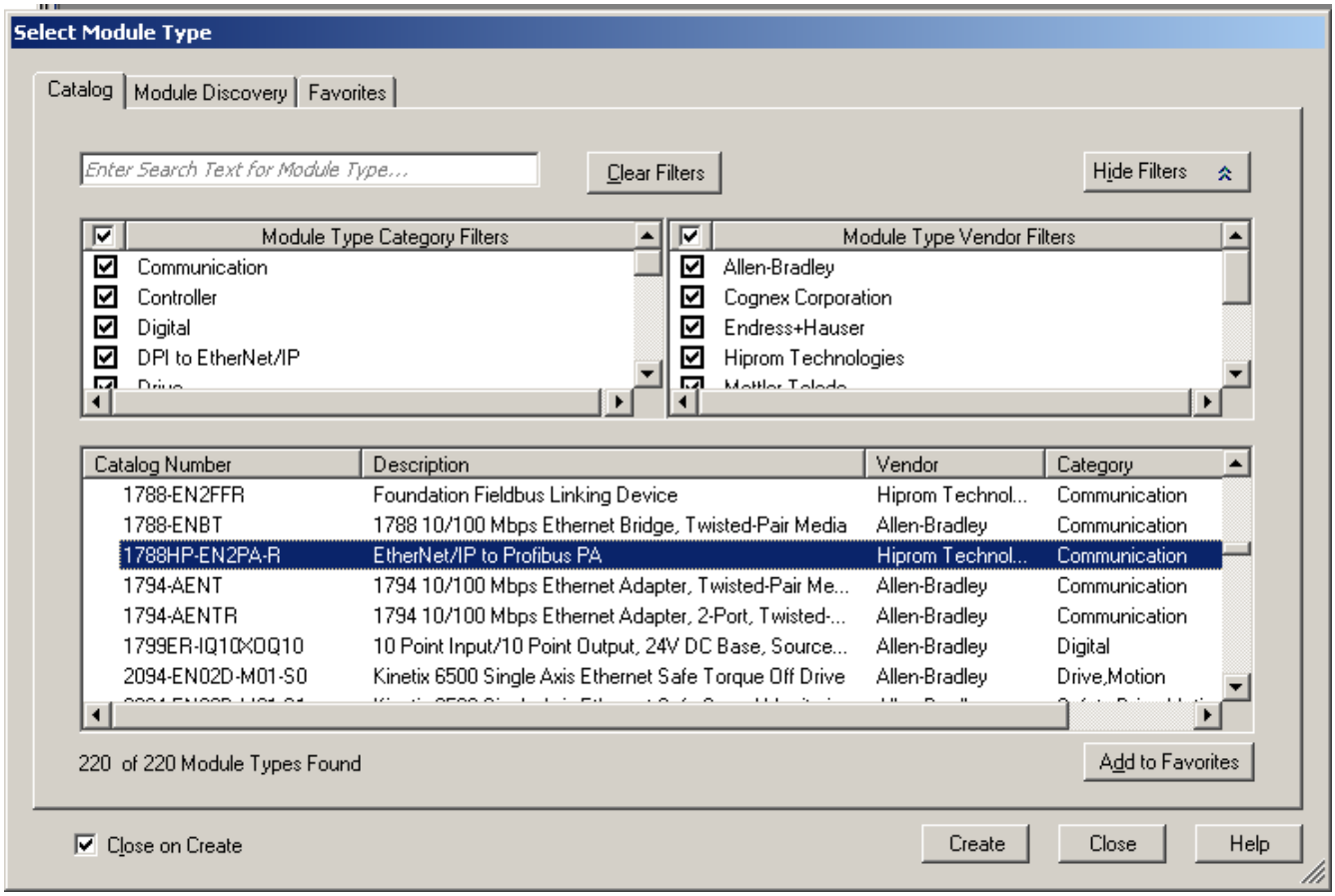


7. Click OK then select New Module again under communications and select Linking device.

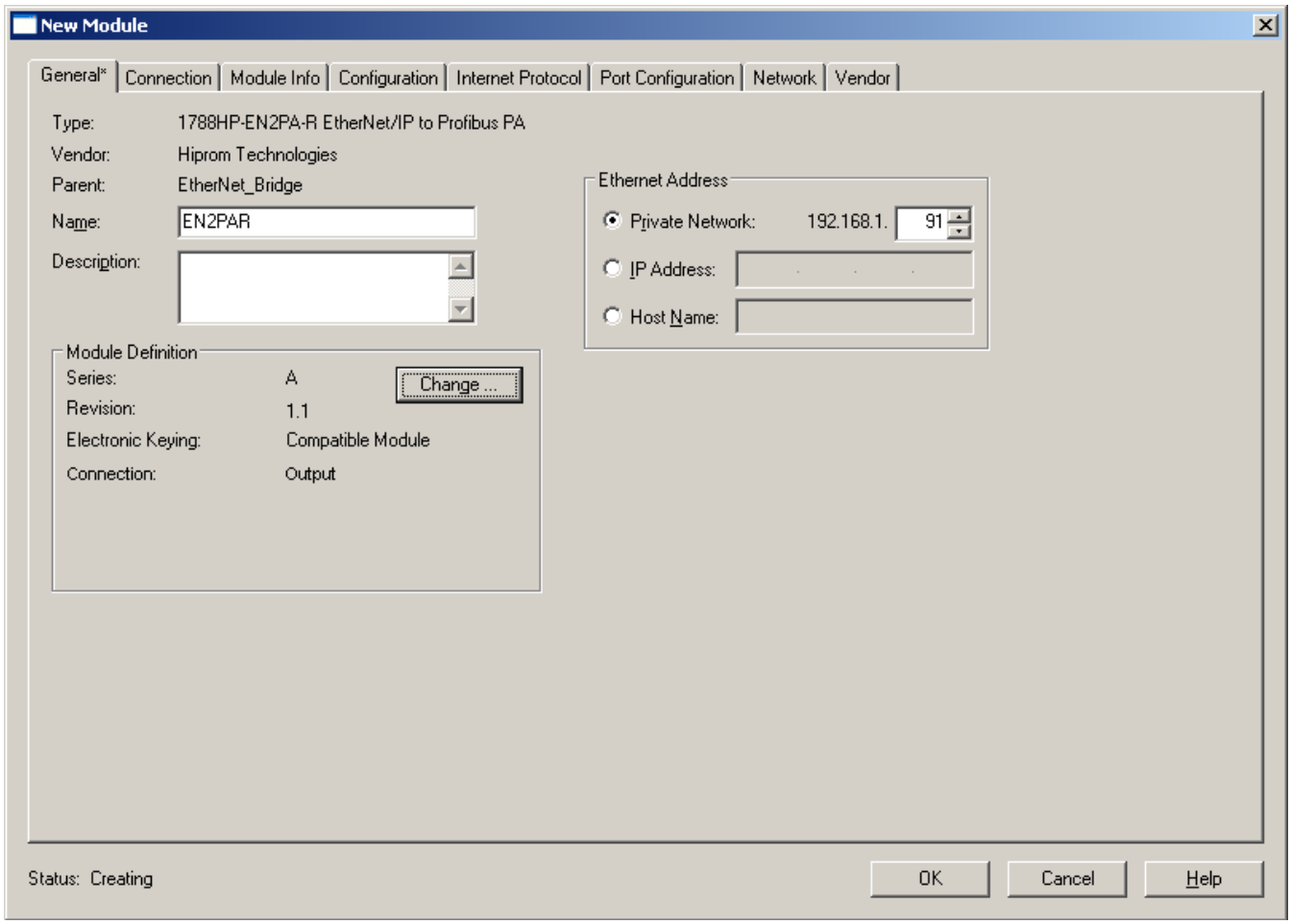


Note: To add the 1788-EN2PAR the user must select the module when adding it under a Allen-Bradley Ethernet bridge (eg. EN2T) as shown above.

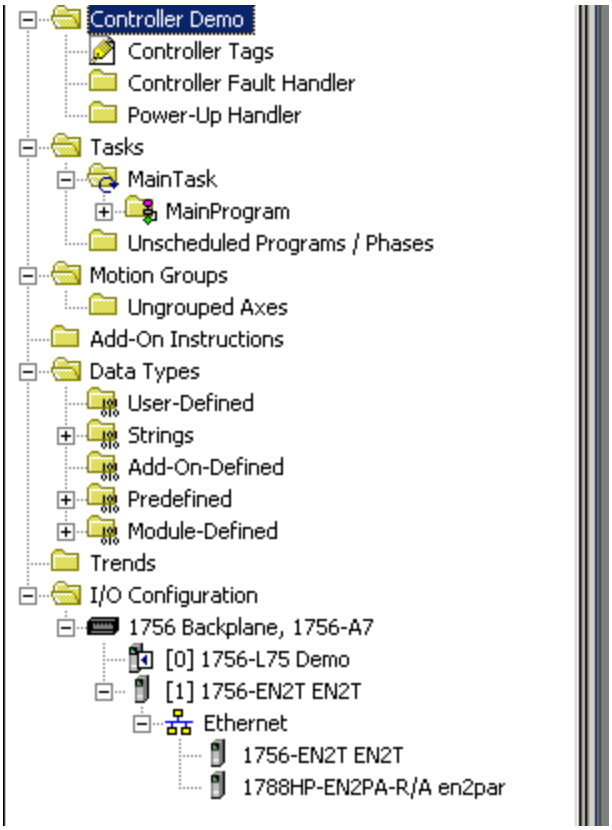
8. Then select the module type when adding it as shown below and click Create.



9. Set the EN2PAR address to 91, and then click OK.



The tree screen should look similar to this.



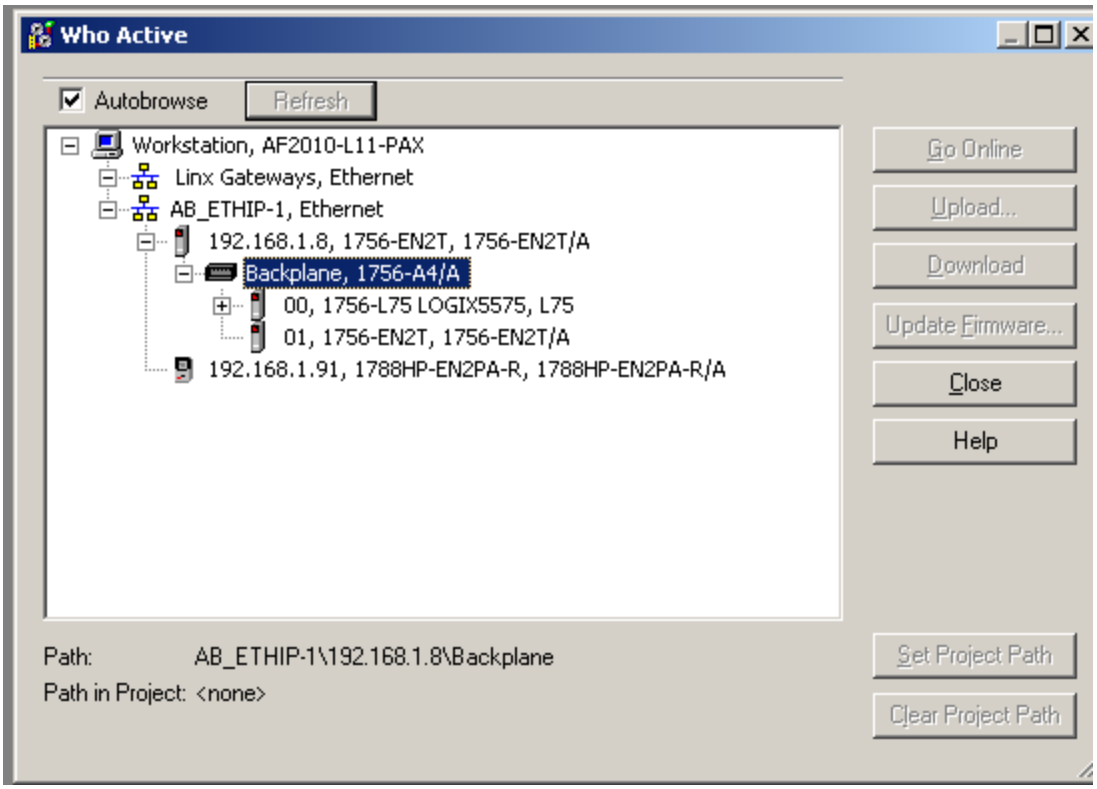
When added, the module requested packet interval (RPI) will default to 300ms. If needed the user can change this depending on the field device count and update times required.

Note: The RPI will determine the amount of Class 1 data requests send for the field devices configured on the PA Bus. Thus if there are many field devices configured on the bus and the RPI is set too low, the field devices will not be able to update in time and all acyclic PA data will be slow as Class 1 data is prioritized. Please see Class 2 MPPF in the master configuration.

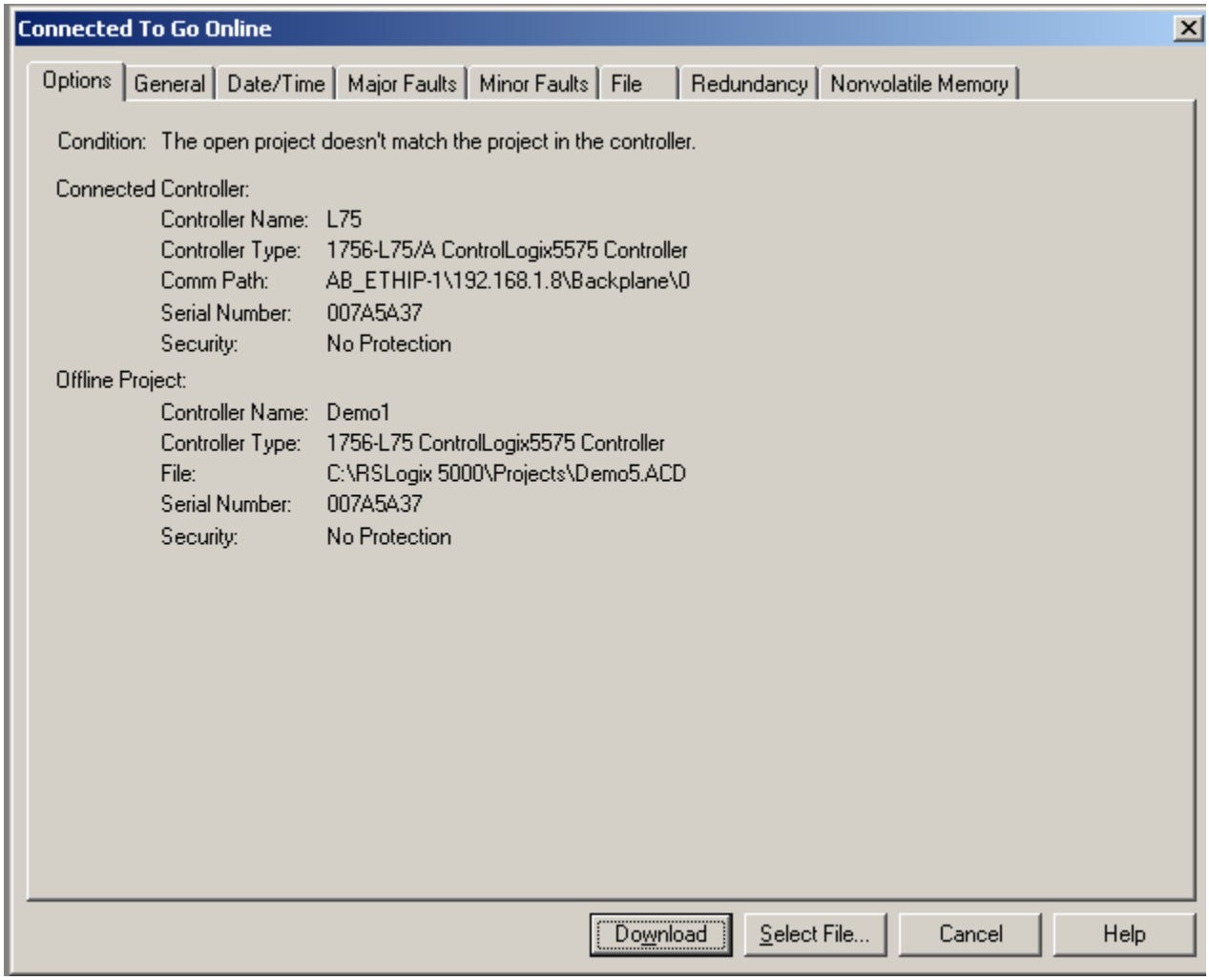
Once the module is added to the tree the user can open the properties by right- clicking on the device and selecting the Properties option. Once the properties window is open select the Configuration tab to

open the 1788-EN2PAR configuration page. For Example settings adding the EN2PAR to the I/o profile. Add the name and address of the device.

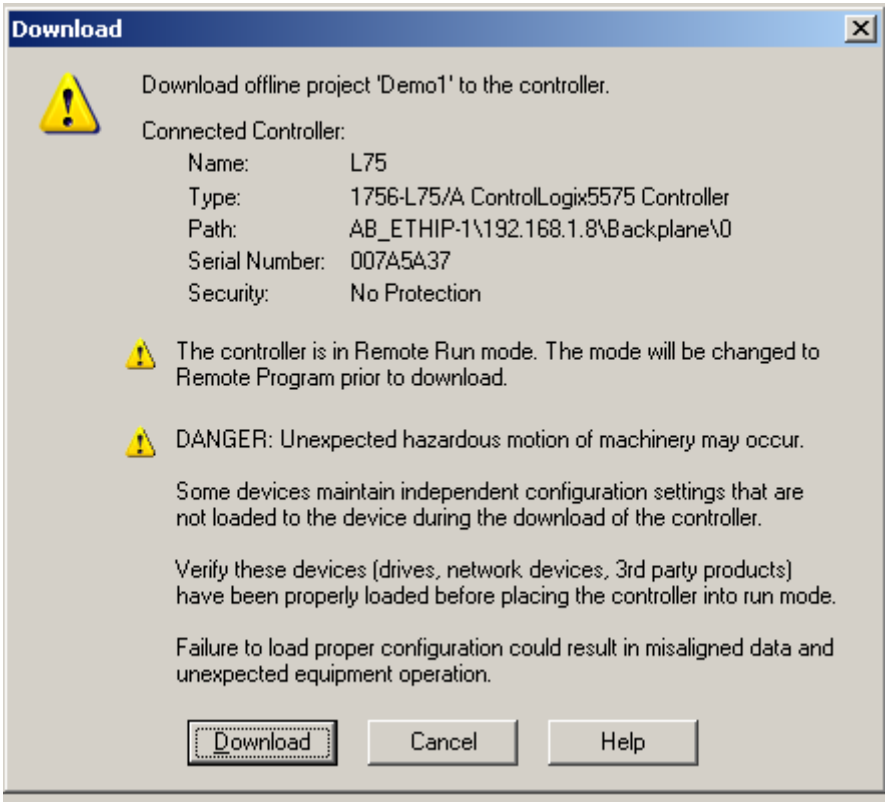
Note: If not already connected, connect the PC and go on-line with RSLogix 5000. Under the communication tab select Who active and select the proper processor.



10. Select or click Download and then Go Online.

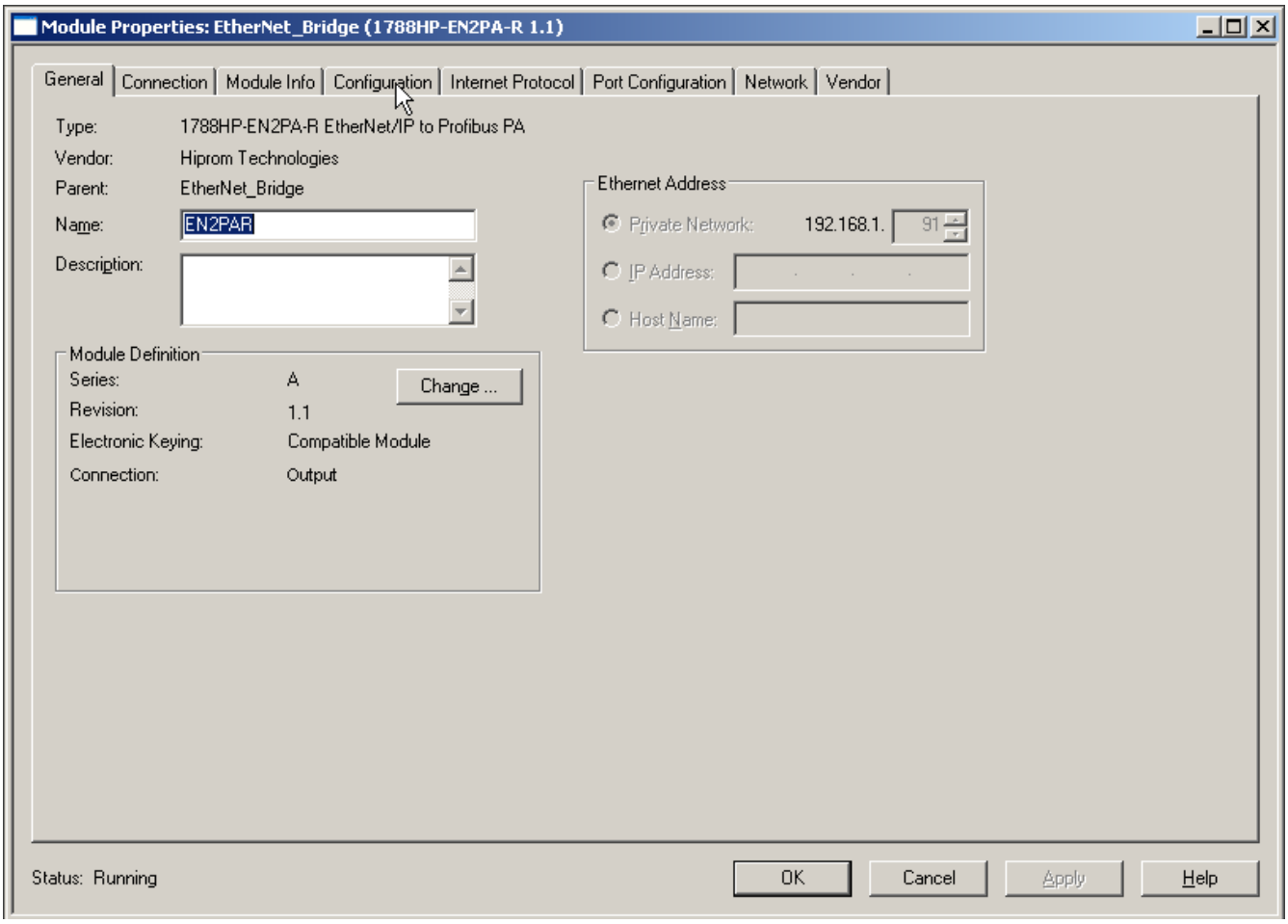


11. The following screens may appear. Click Download again.

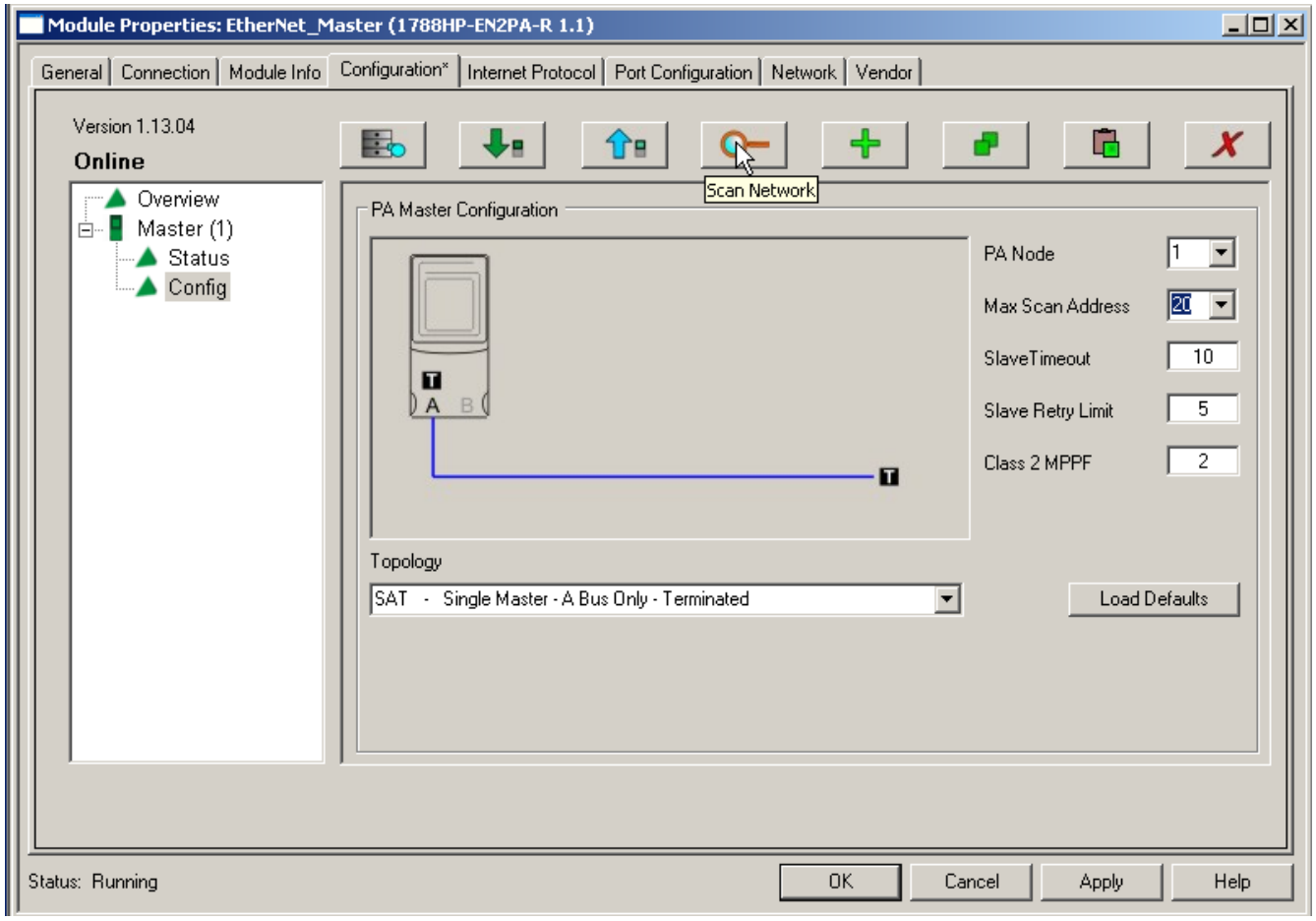

Download
Download offline project 'Demo1' to the controller.
Connected Controller:
Name: L75
Type: 1756-L75/A ControlLogix5575 Controller
Path: AB_ETHIP-1\192.168.1.8\Backplane\0
Serial Number: 007A5A37
Security: No Protection
The controller is in Remote Run mode. The mode will be changed to Remote Program prior to download.
DANGER: Unexpected hazardous motion of machinery may occur.
Some devices maintain independent configuration settings that are not loaded to the device during the download of the controller.
Verify these devices (drives, network devices, 3rd party products) have been properly loaded before placing the controller into run mode.
Failure to load proper configuration could result in misaligned data and unexpected equipment operation.
Download
Cancel
Help

12. Select Yes when complete and verify the "online" screen status.

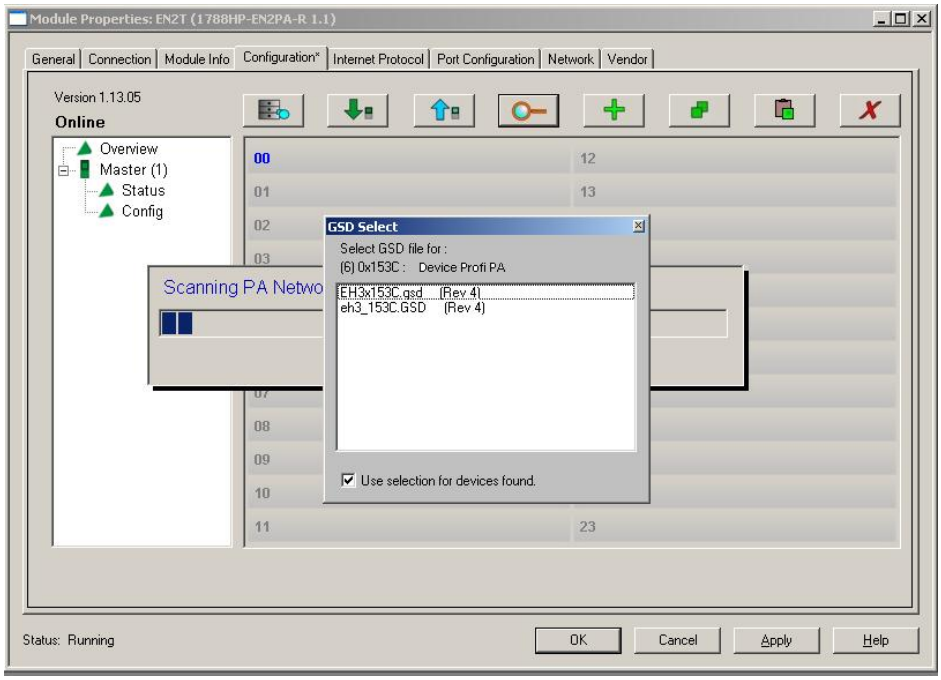
13. Right click on the 1788-EN2PAR in the I/O tree, then select properties and left click. The following appears:



14. Select the configuration tab, and select master (1) configuration.



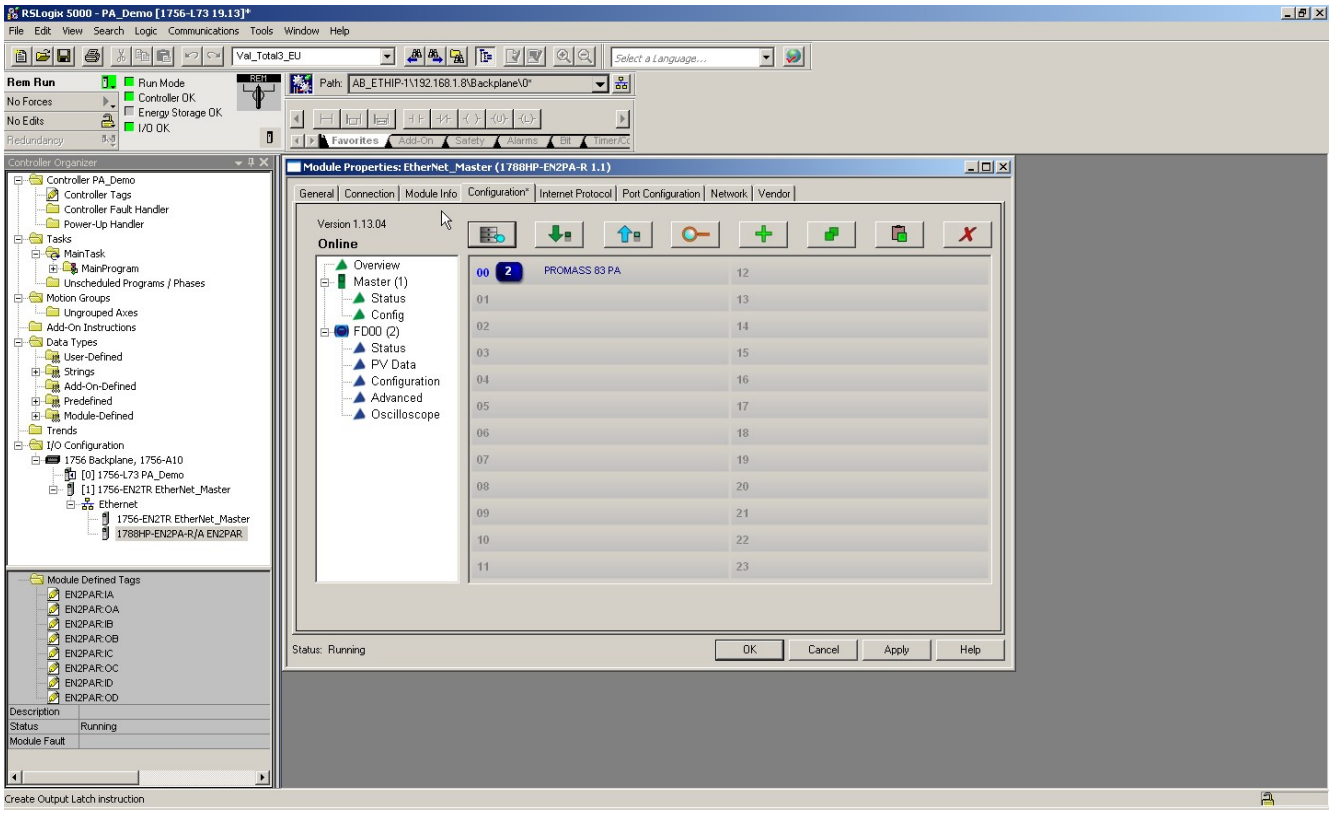
15. Select Scan network.



16. Select the GSD File.

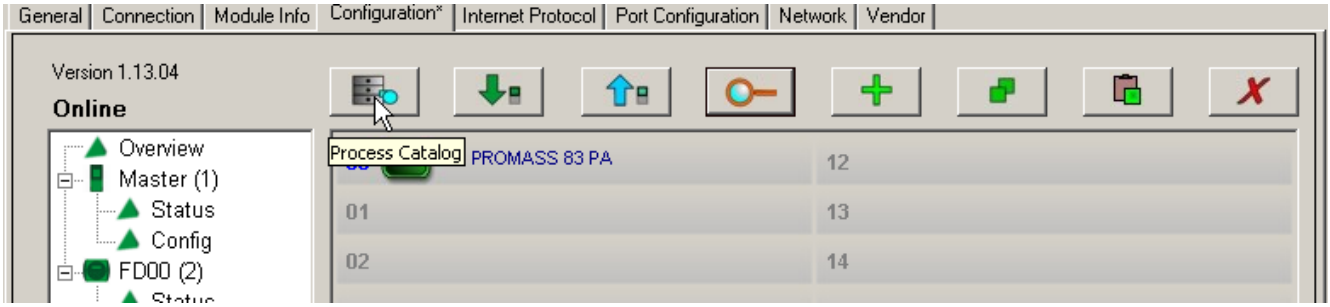
Note: If the above screen appears then the GSD files are loaded.

17. Select the scan network button and the following screen should appear. If the new device is found click OK.

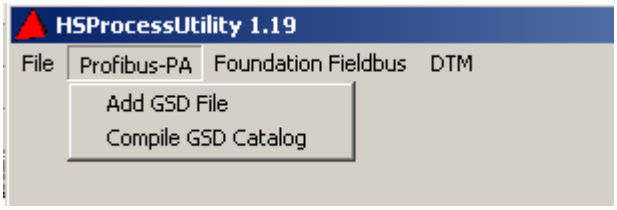


Note: The following steps 18.-21. are used only if new GSD files are required. If not go to step 22.

18. Select the Process Catalog button. This will launch the Process Utility that manages the GSD files and DTMs. Thus if the user loaded new DTMs or GSD files the Process Utility must be launched and the libraries must be updated. The following should appear:



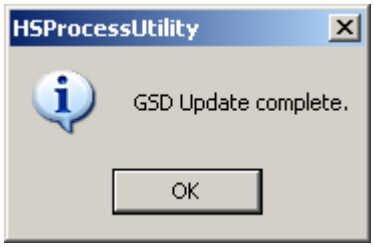
19. The Process utility opens. Select Profi PA and compile the GSD file.



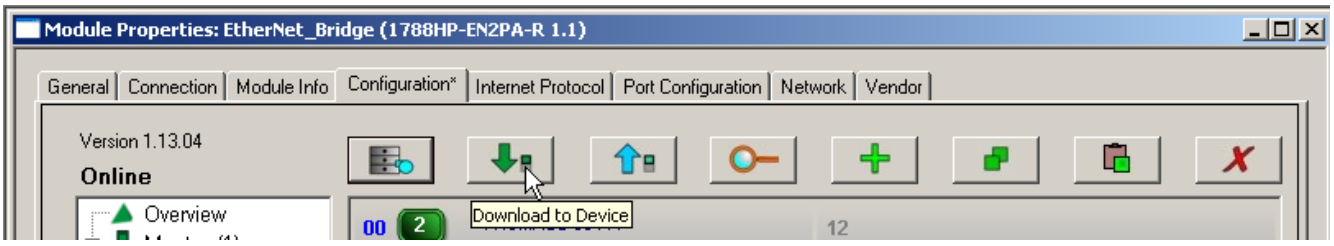
20. When complete devices with GSD files will be displayed in the left pane.

Note: The default device settings shown can be changed. Refer to the device manual. The user will not be able to configure a field device for cyclic communication unless the GSD file is in the Process Utility Catalog and the catalog has been updated as shown below:.

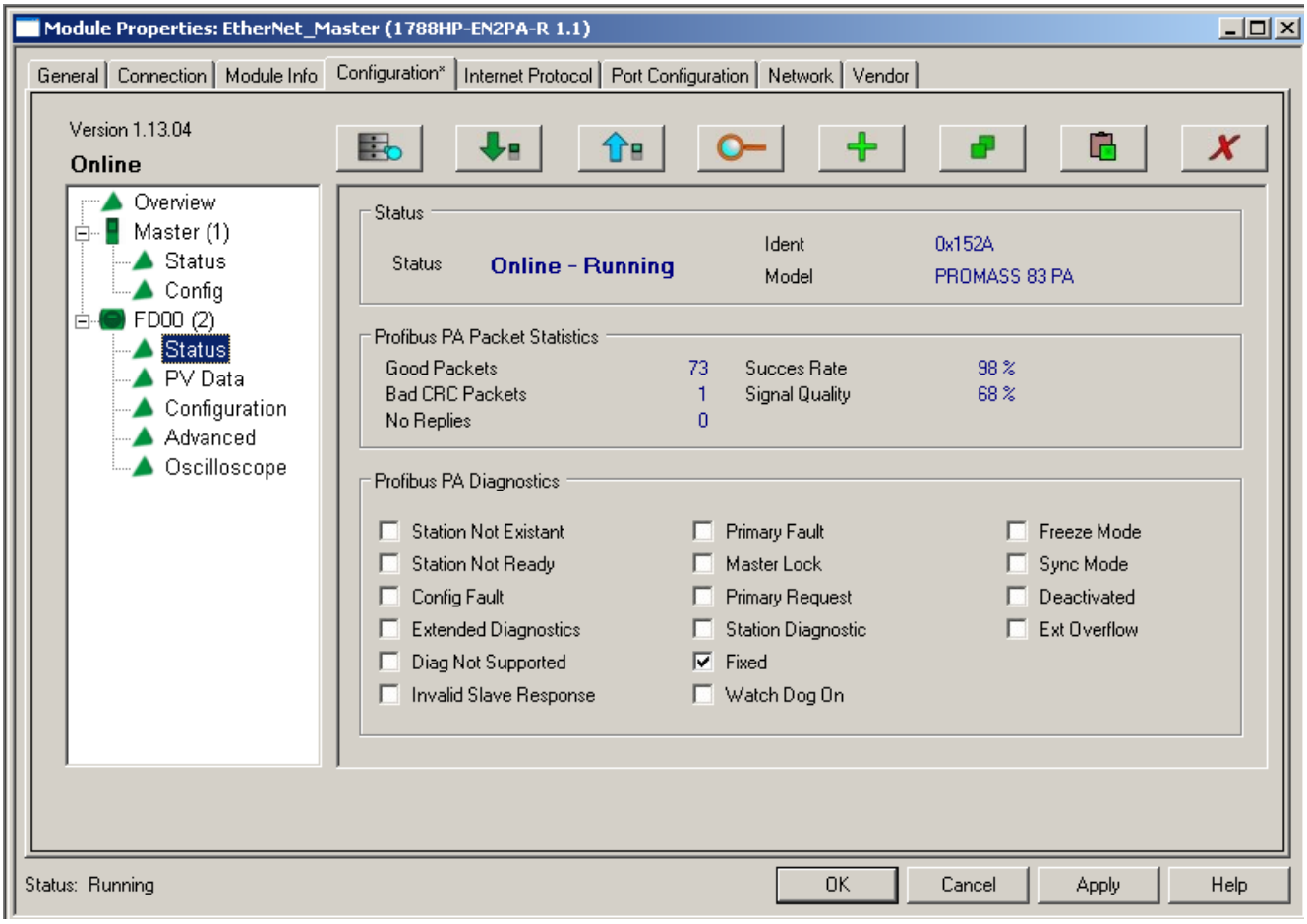
21. Select OK.



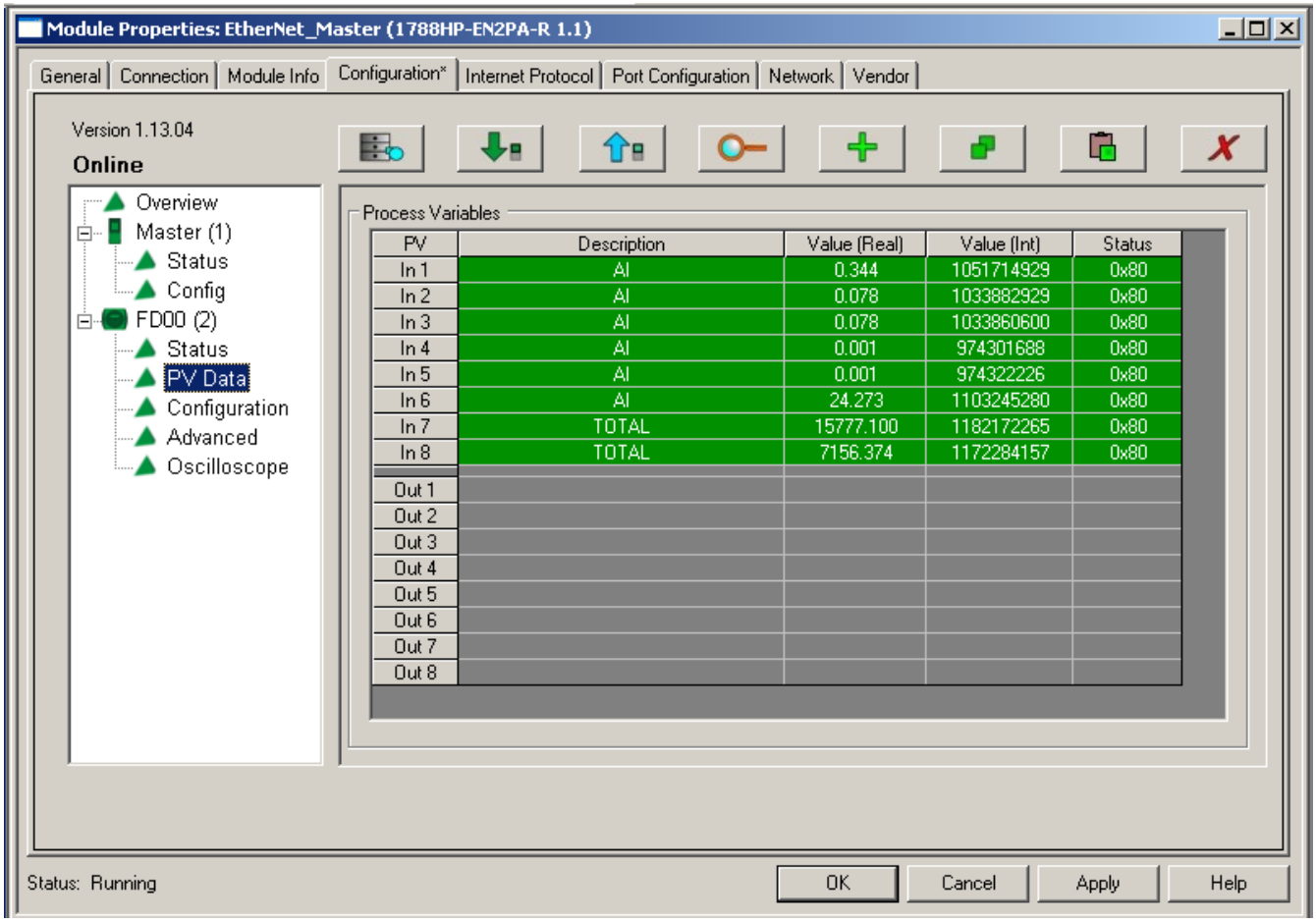
22. Select Download.



23. When completed select Status and Select PV Data.



Note: The following should appear with live data. All appropriate fields should be green.



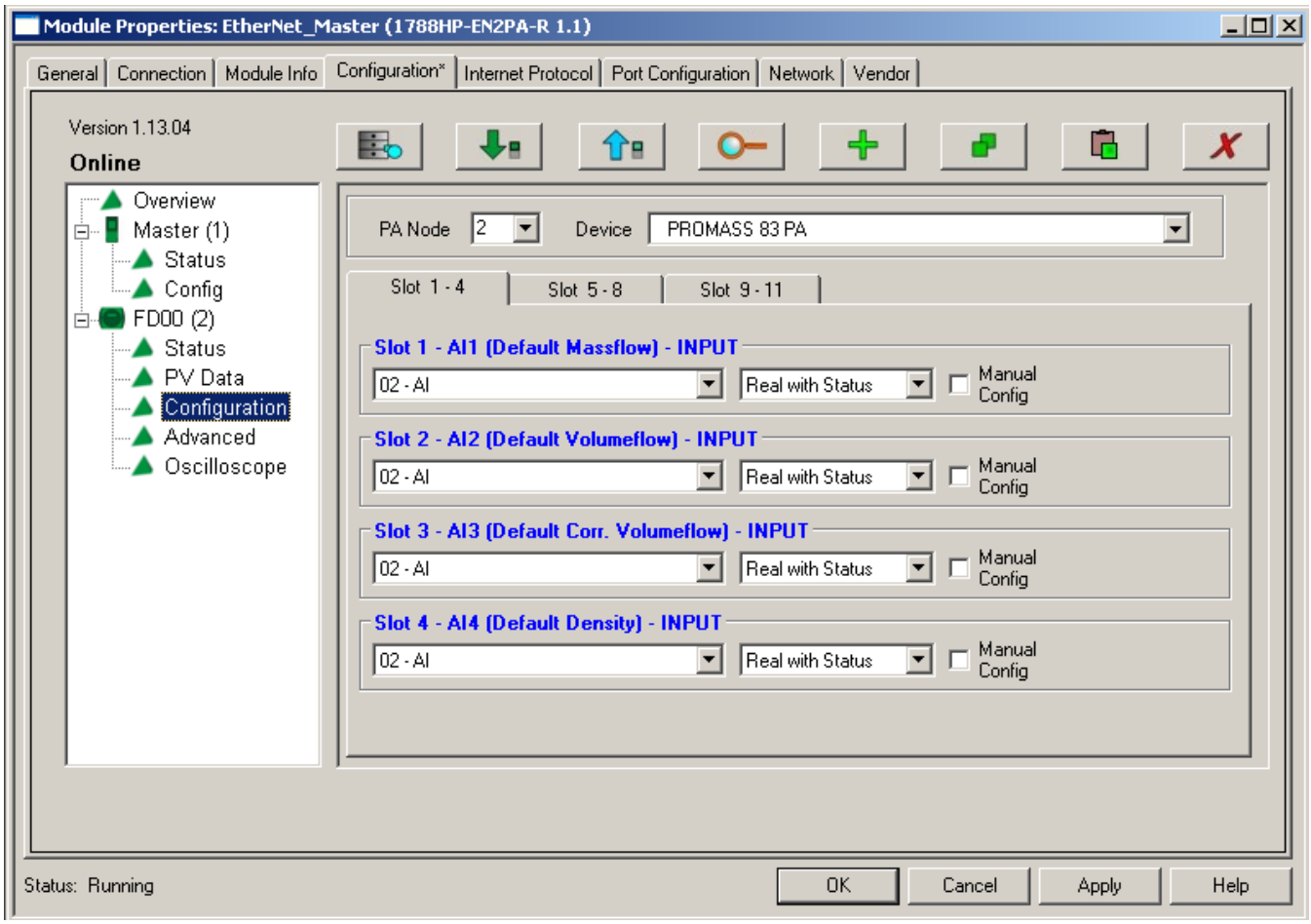
Once the user is happy with the configuration it can be downloaded to the 1788-EN2PAR. The device will save the configuration in non-volatile memory. If the power is cycled then the module will use the last configuration saved.

24. Select the download icon and click.

Note: Any changes will only take effect once it has been downloaded to the 1788-EN2PAR module.

Note: If the user is not certain about the format of the PV please refer to the user manual of the field device being used.

25. If required, from the On-line properties screen select configuration and the user can choose the format clicking on the configuration drop-down menu and selecting as shown below.



See Additional Resources or Chapter Signals from Instruments to Control System for CHANNEL assignment.

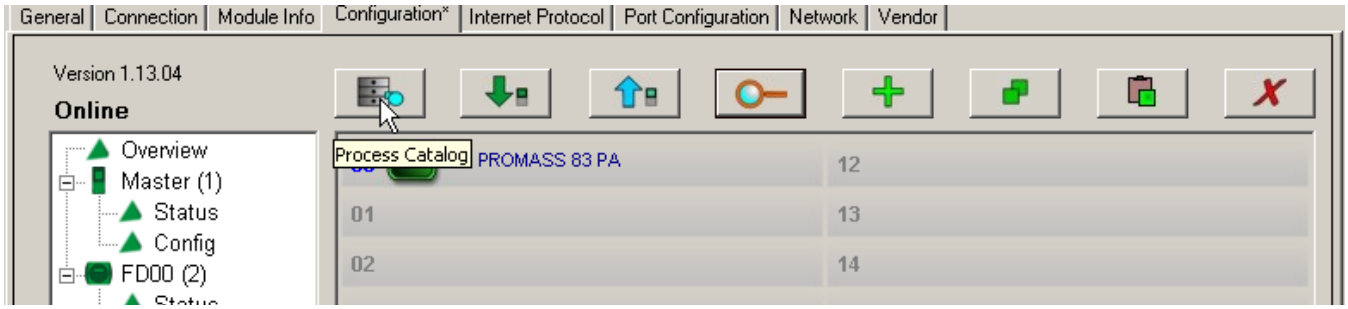
26. Return to the Overview.

Device Type Manager (DTM)

The DTM can be used either in the profile with the ThinFrame or using a FDT Frame (eg. AssetCentre or FieldCare).

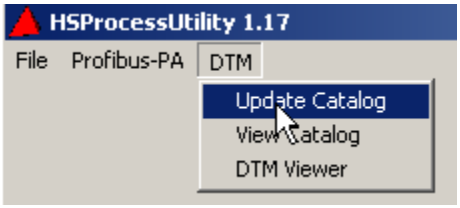
Note: The ThinFrame can only view diagnostics of the field device. The user will need a FDT frame to configure and parameterize the field device.

1. Select Process Catalog and launch the DTM Tool.

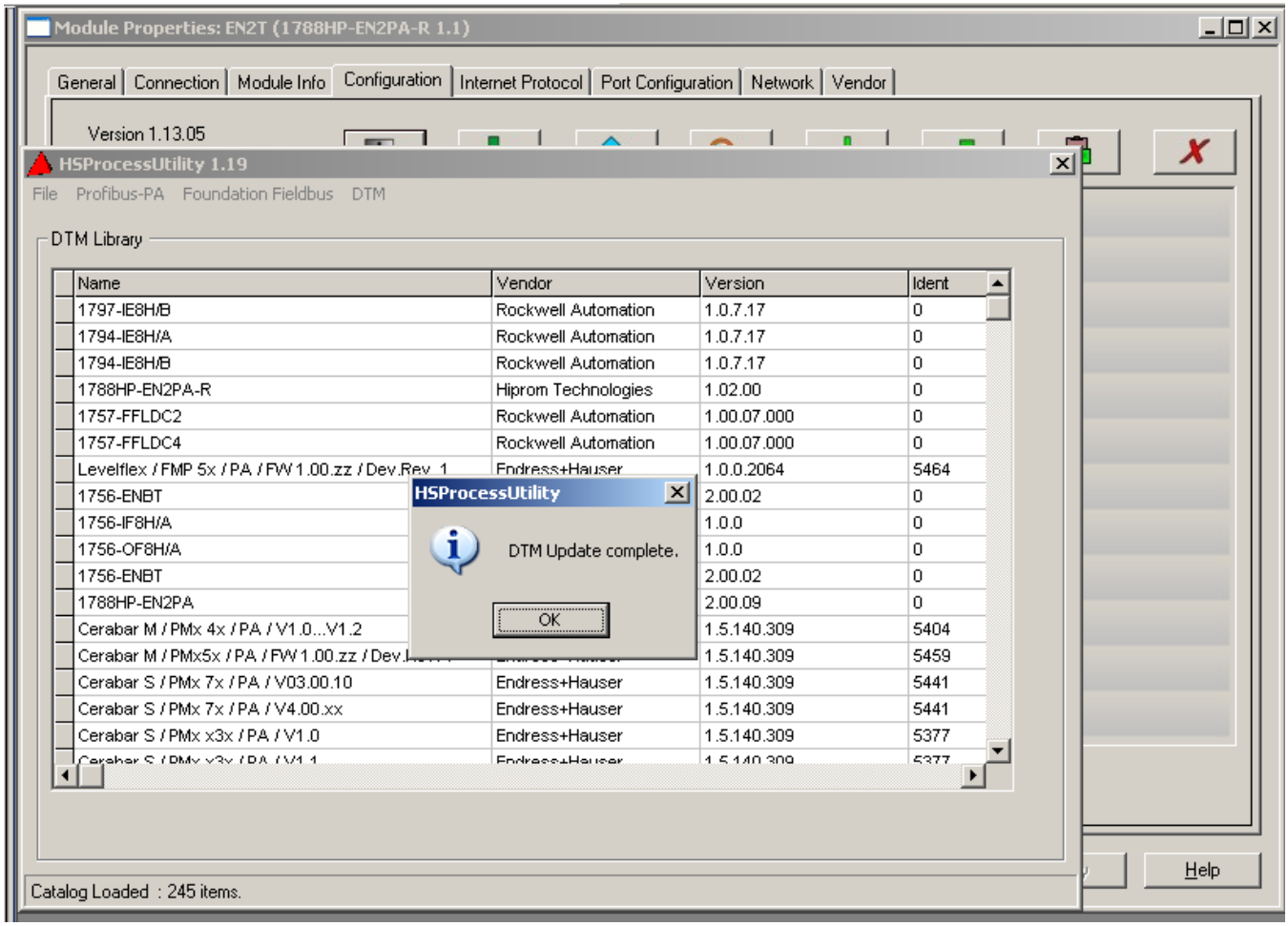


2. The user must first update the DTM catalog by launching the Process Utility and selecting Update Catalog as shown below:

   Note: The update is required only once or if new devices are added.

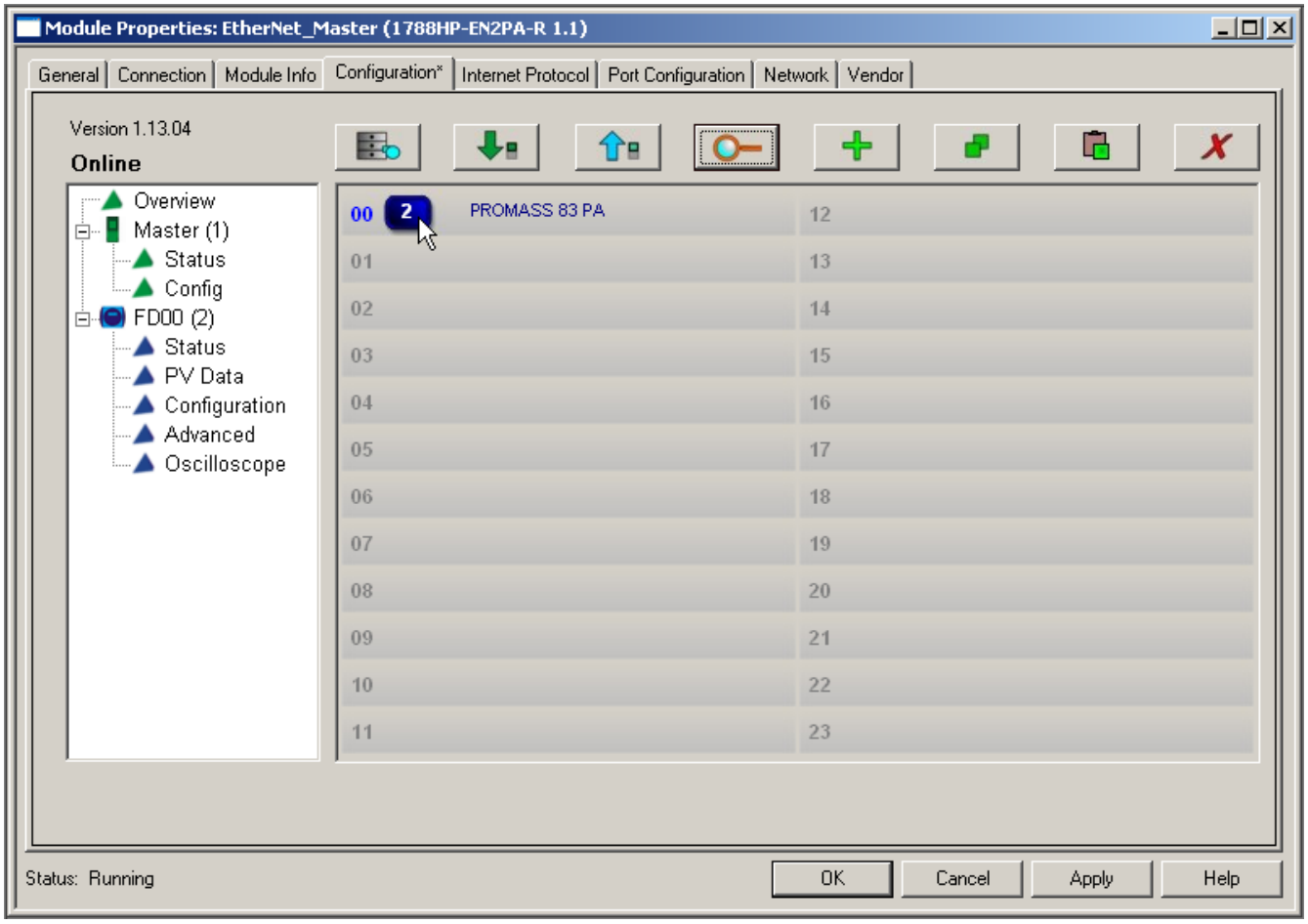


3. After the update is complete the user can select the DTM in the AOP by selecting the correct DTM.

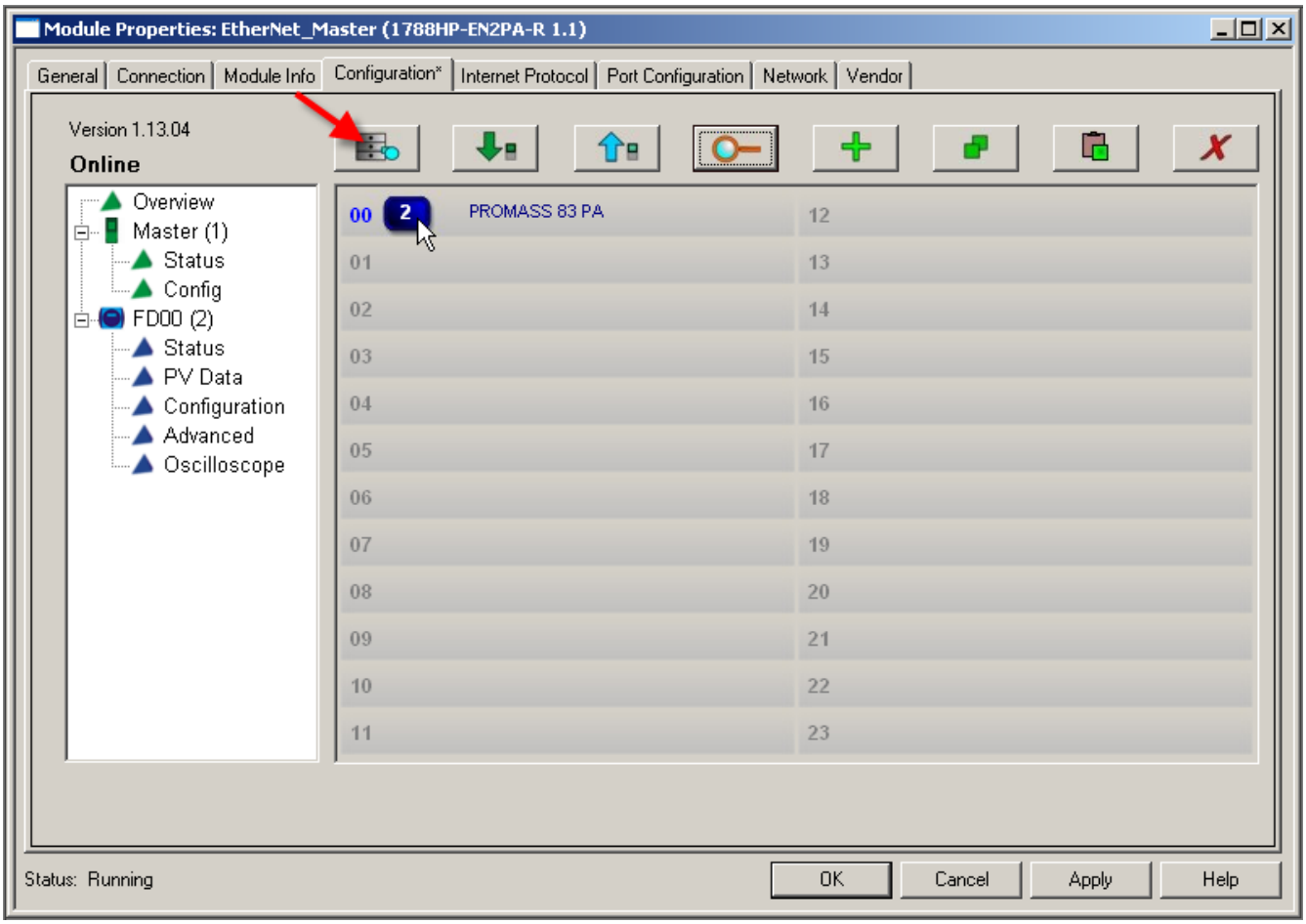


4. Click OK. Save and Close the project then reopen the project/ AOP and Go Online.

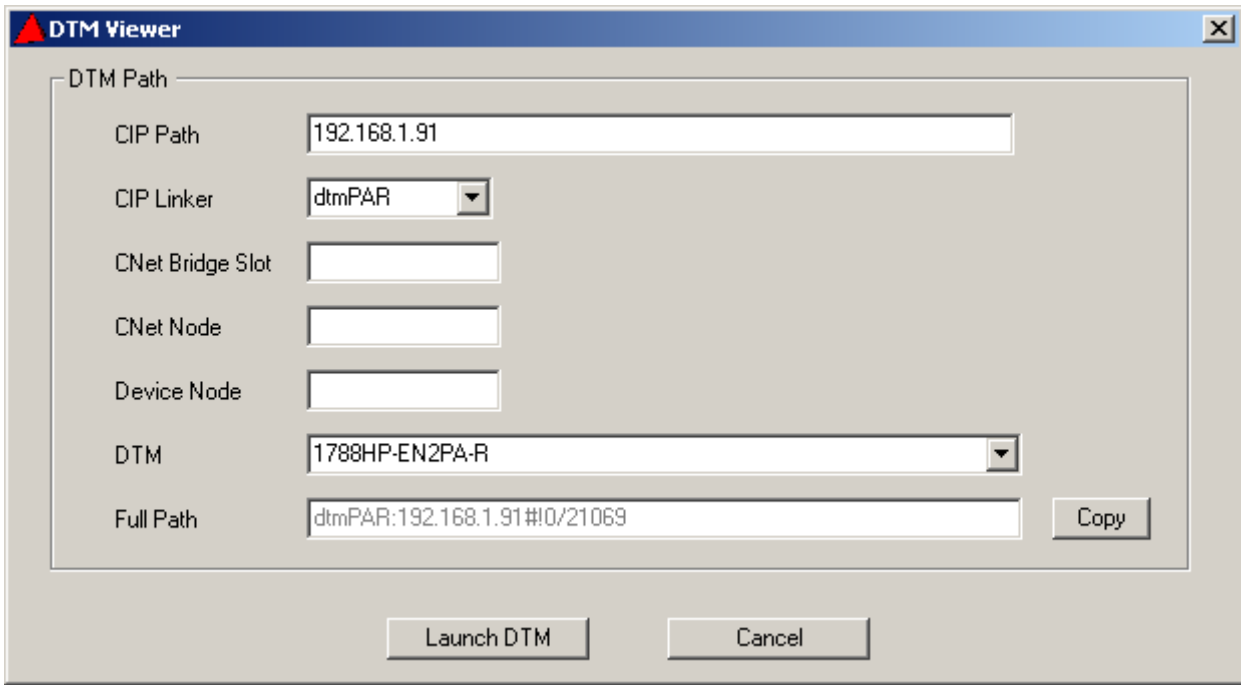
5. Right-click on the EN2PAR and select properties to open the AOP. Go to the device Configuration tab then select the device.



6. From the AOP select the Process Catalog.

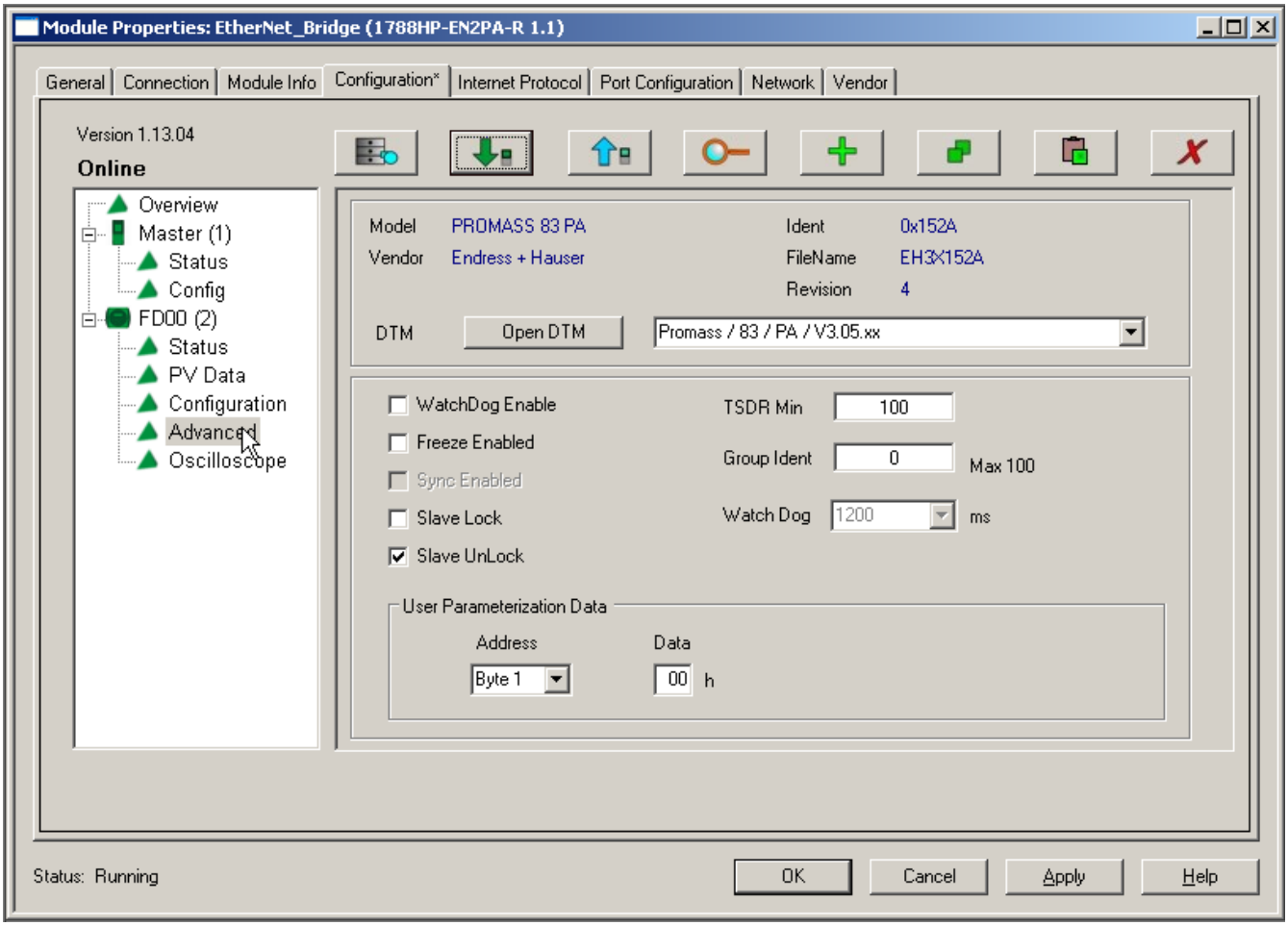


7. Then select DTM and DTM viewer.

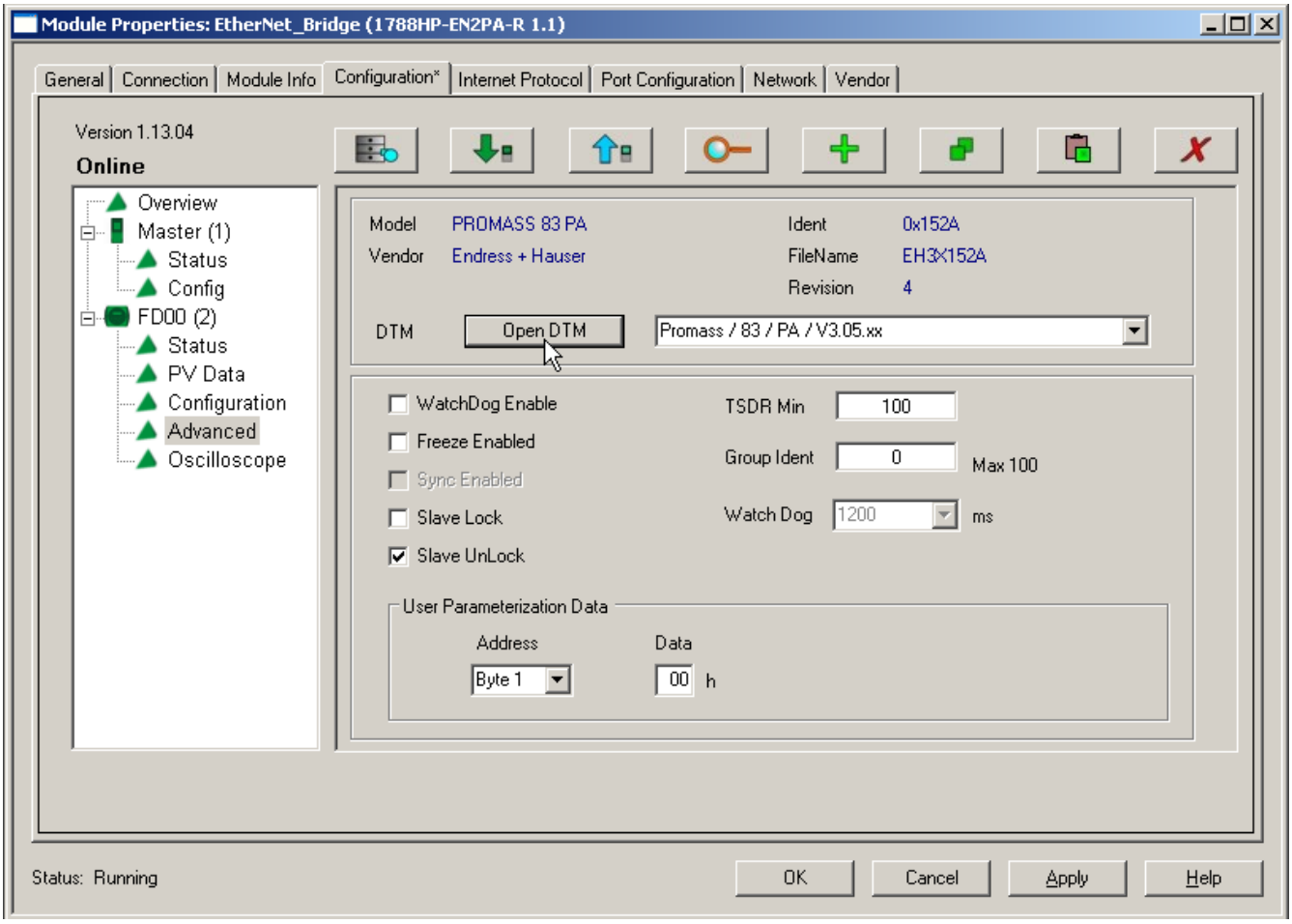


8. Verify the communication DTM and close.

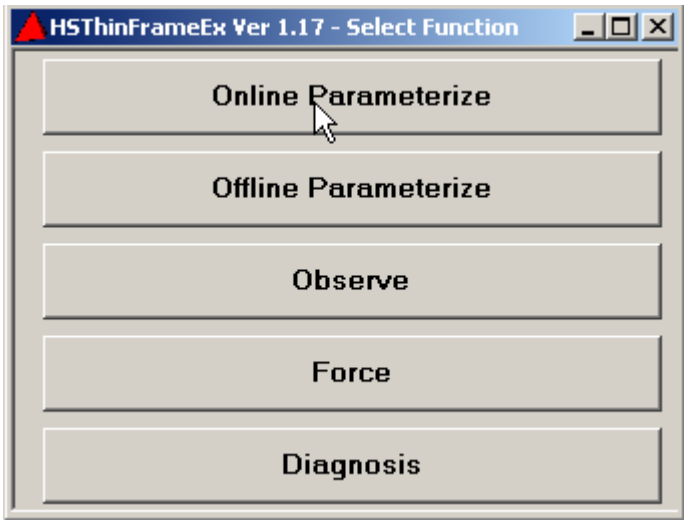
9. Select the Advanced Tab.



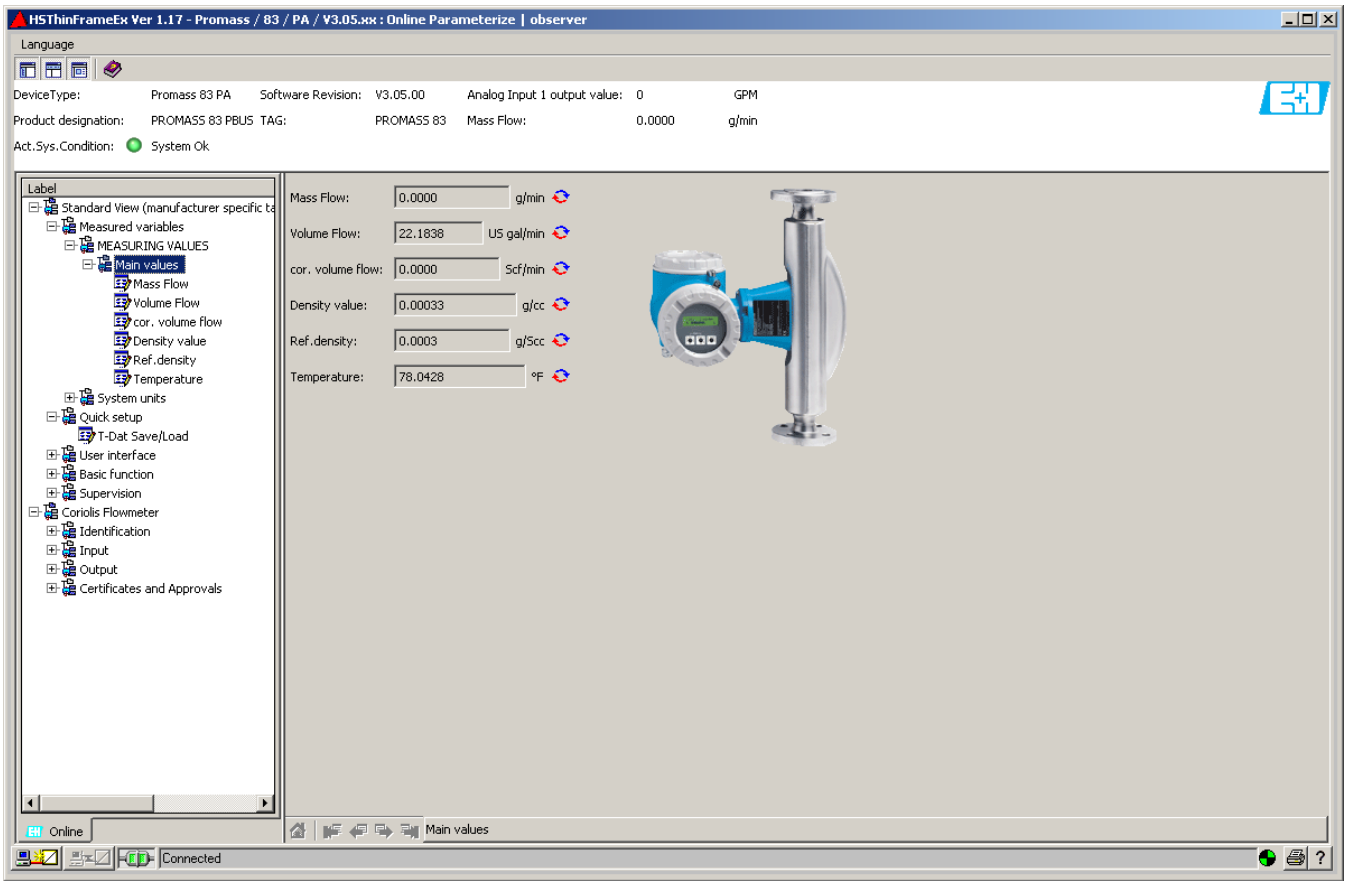
10. Open the DTM Pull Down tab and select the proper DTM.



11. Press Open DTM, Go Online and select open DTM and select Online Parameterize.



12. Select standard view and measuring values or other desired screens.
Note: This is a view-only screen.



13. The Instrument has now been configured. Save the Project.

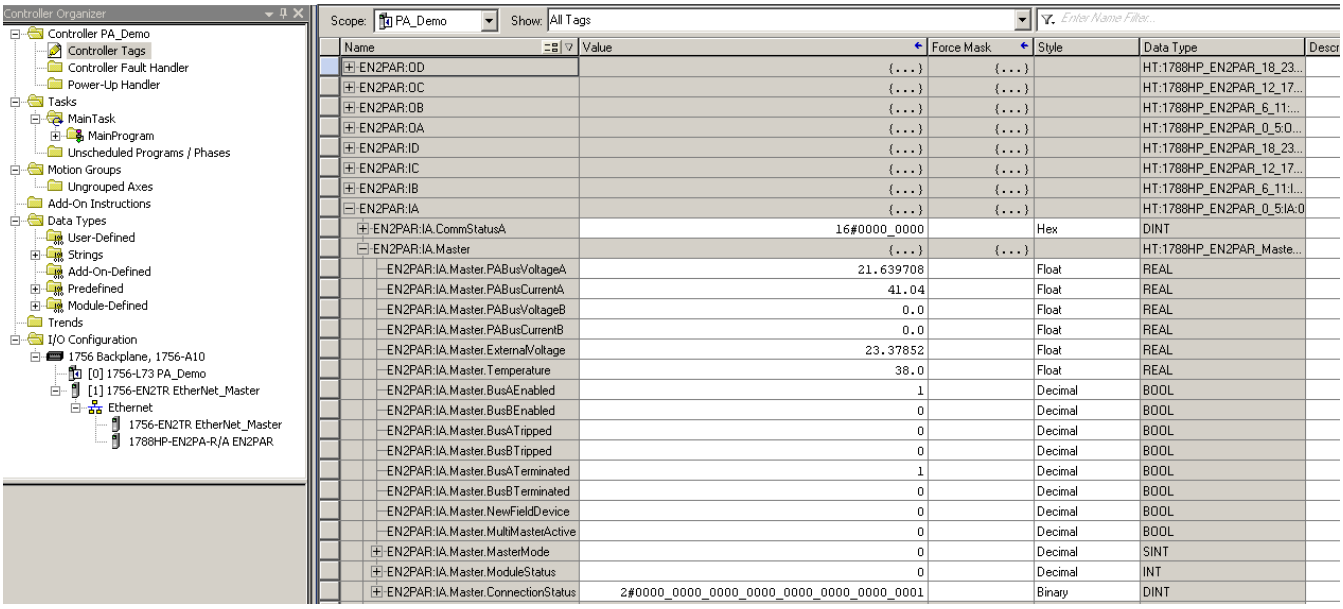
Note: Sometimes the user will be presented with multiple DTMs of the same device but different revisions. The user must select the correct one for the specific field device.

Verify Operation using RSLogix

Each 1788-EN2PAR consumes a total of 4 connections from the Logix Controller regardless of the field device count. Thus the input and output image of each 1788-EN2PAR is divided into four sections A to D. The first connection will have the PA Master Data added as well.

Using the AOP to monitor online data:

1. In the RSLogix 5000 tree, select Controller Tags. Look up and select the EN2PAR:IA monitor tags, then select master.



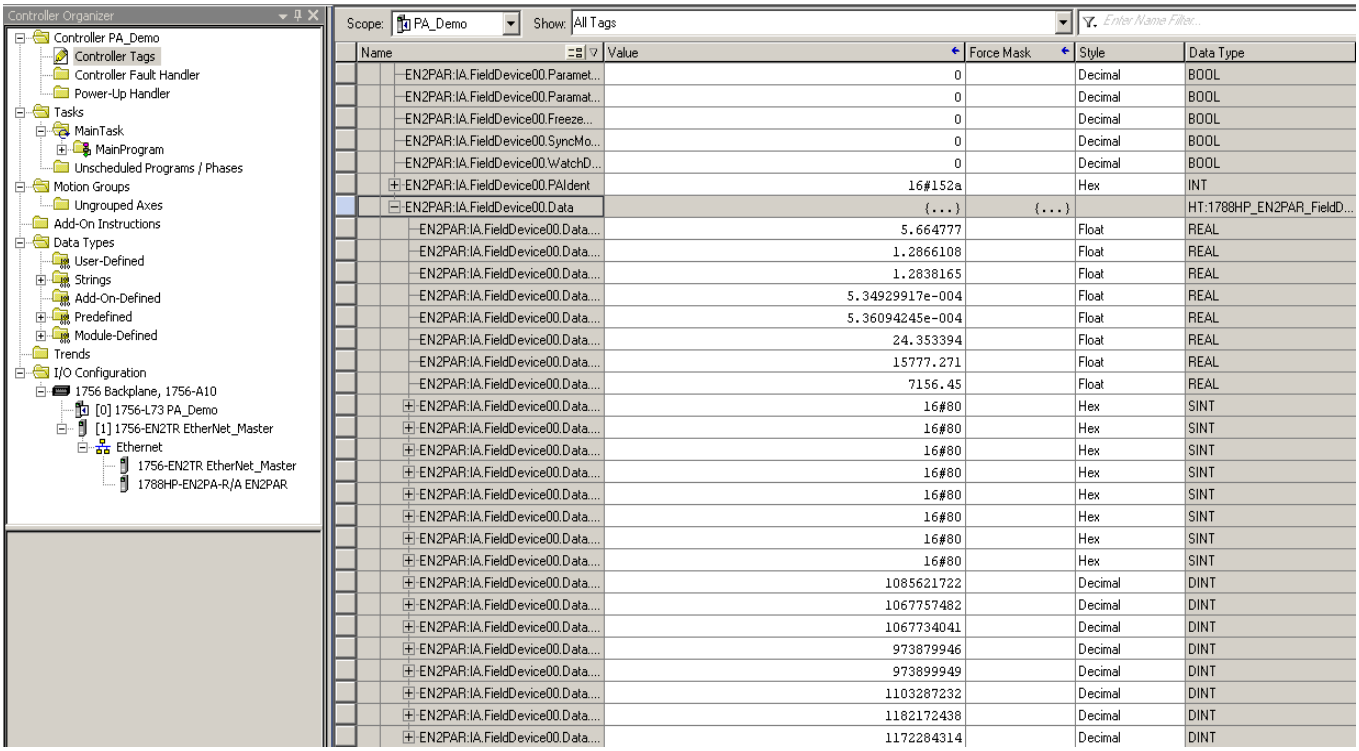
Name	Value	Force Mask	Style	Data Type	Descr
EN2PAR:OD	{...}	{...}		HT:1788HP_EN2PAR_18_23...	
EN2PAR:OC	{...}	{...}		HT:1788HP_EN2PAR_12_17...	
EN2PAR:OB	{...}	{...}		HT:1788HP_EN2PAR_6_11:...	
EN2PAR:OA	{...}	{...}		HT:1788HP_EN2PAR_0_5:O...	
EN2PAR:ID	{...}	{...}		HT:1788HP_EN2PAR_18_23...	
EN2PAR:IC	{...}	{...}		HT:1788HP_EN2PAR_12_17...	
EN2PAR:IB	{...}	{...}		HT:1788HP_EN2PAR_6_11:I...	
EN2PAR:IA	{...}	{...}		HT:1788HP_EN2PAR_0_5:IA:0	
EN2PAR:IA.CommStatusA	16#0000_0000		Hex	DINT	
EN2PAR:IA.Master	{...}	{...}		HT:1788HP_EN2PAR_Maste...	
EN2PAR:IA.Master.PABusVoltageA	21.639708		Float	REAL	
EN2PAR:IA.Master.PABusCurrentA	41.04		Float	REAL	
EN2PAR:IA.Master.PABusVoltageB	0.0		Float	REAL	
EN2PAR:IA.Master.PABusCurrentB	0.0		Float	REAL	
EN2PAR:IA.Master.ExternalVoltage	23.37852		Float	REAL	
EN2PAR:IA.Master.Temperature	38.0		Float	REAL	
EN2PAR:IA.Master.BusAEnabled	1		Decimal	BOOL	
EN2PAR:IA.Master.BusBEnabled	0		Decimal	BOOL	
EN2PAR:IA.Master.BusATripped	0		Decimal	BOOL	
EN2PAR:IA.Master.BusBTripped	0		Decimal	BOOL	
EN2PAR:IA.Master.BusATerminated	1		Decimal	BOOL	
EN2PAR:IA.Master.BusBTerminated	0		Decimal	BOOL	
EN2PAR:IA.Master.NewFieldDevice	0		Decimal	BOOL	
EN2PAR:IA.Master.MultiMasterActive	0		Decimal	BOOL	
EN2PAR:IA.Master.MasterMode	0		Decimal	SINT	
EN2PAR:IA.Master.ModuleStatus	0		Decimal	INT	
EN2PAR:IA.Master.ConnectionStatus	2#0000_0000_0000_0000_0000_0000_0000_0001		Binary	DINT	

Once the two PA Master modules have sync'd and they have the same node number as well as the same configuration then this bit will be set.

Note: Both PA Masters must have exactly the same configuration (master and field devices) for the masters to be able to sync.

If a field device is online and running (exchanging cyclic data) then its field device index bit in (the connection status) will be set. If the device goes offline the bit will be cleared.

2. Select Field Device 0 and click Data. Each field device will display its PA diagnostics as well as all available PVs and their status as shown below:



If the user has set a process variable to have a Status the user will find the status value for the each PV in this section.

3. When finished close RSLogix.

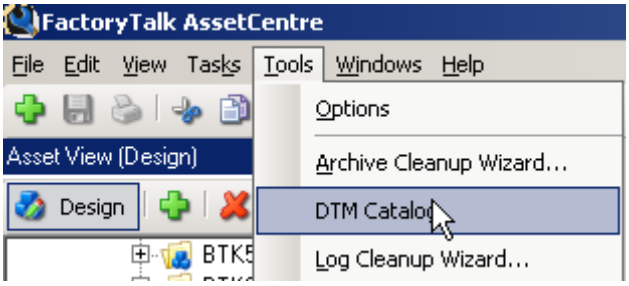
Connect to, Monitor and Configure the Instrument via AssetCentre

AssetCentre from Rockwell is the FDT based plant asset management software tool that lets you configure the intelligent field instruments from E+H. An optional tool called Fieldcare is also available from E+H.

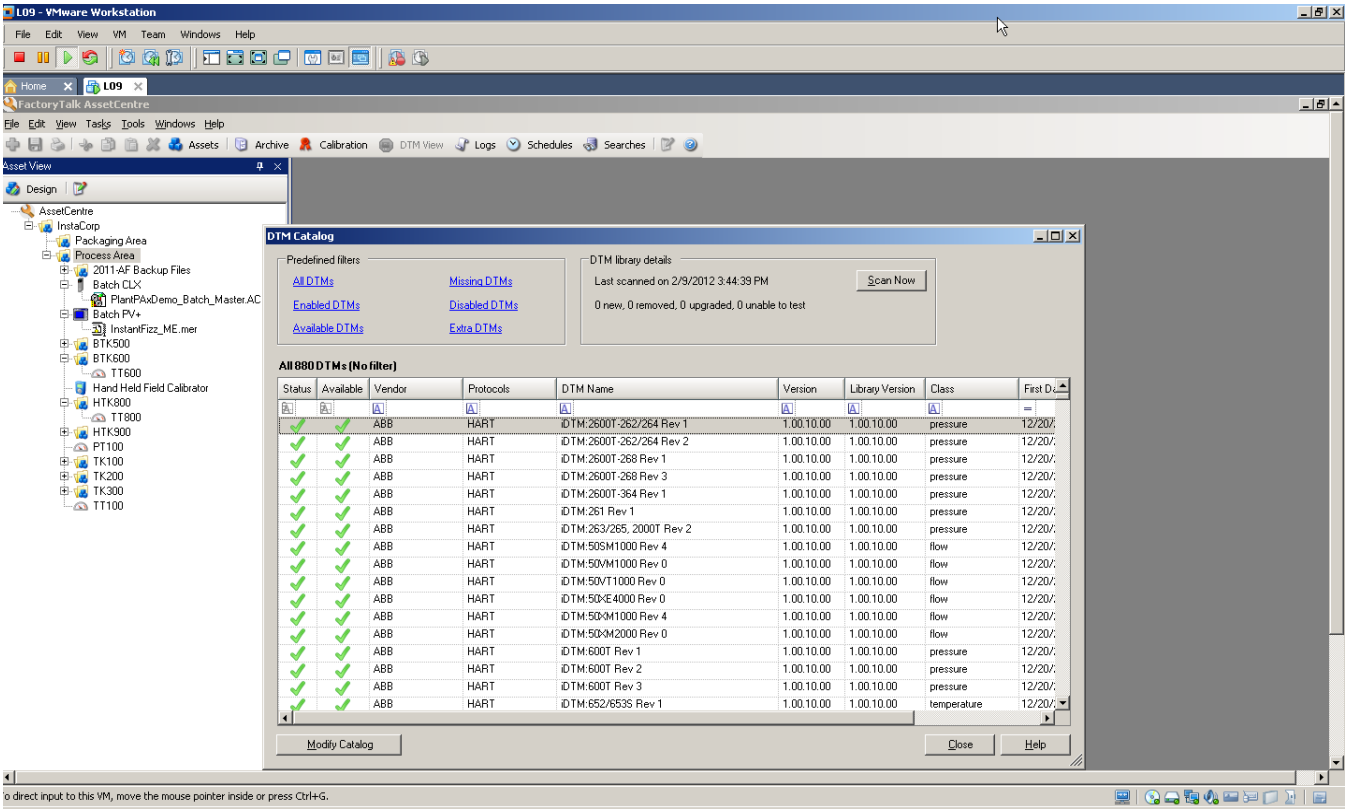
NOTE: Before starting make sure the DTM's have been imported and installed for the HiProm Communication linking device and the E+H Instrument. To access the DTMs and other software download them from the HiProm and/or E+H websites.

1. Install the appropriate DTMs.
2. Start-up AssetCentre and open a new project.

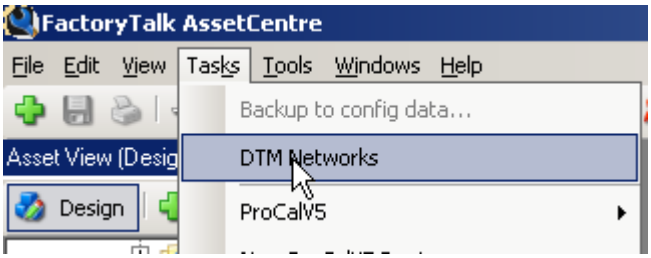
3. Update the DTM catalog under Tools.



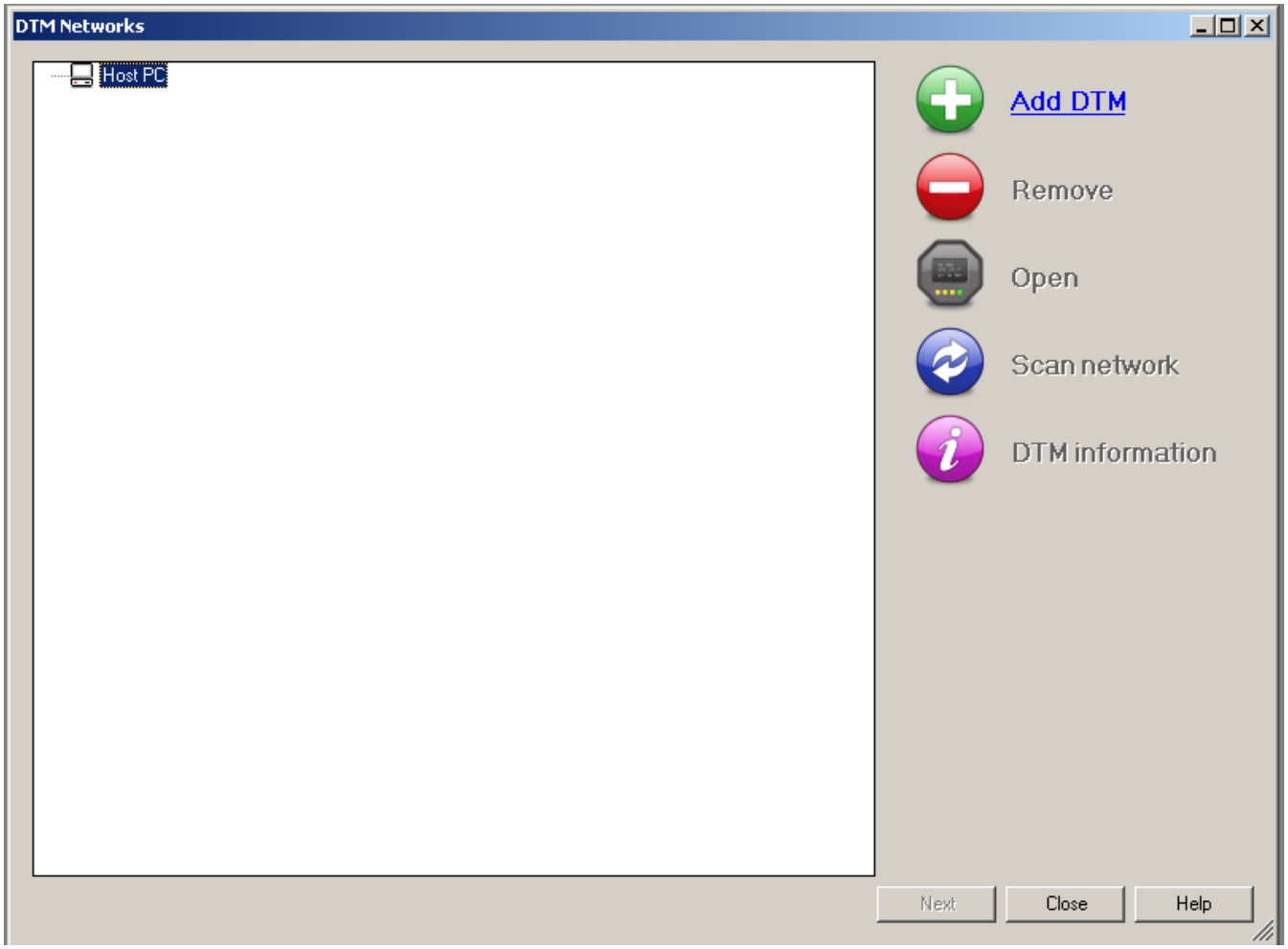
4. Click and verify that the DTMs now exist in the catalog as shown in the example screen below. Scan if necessary.



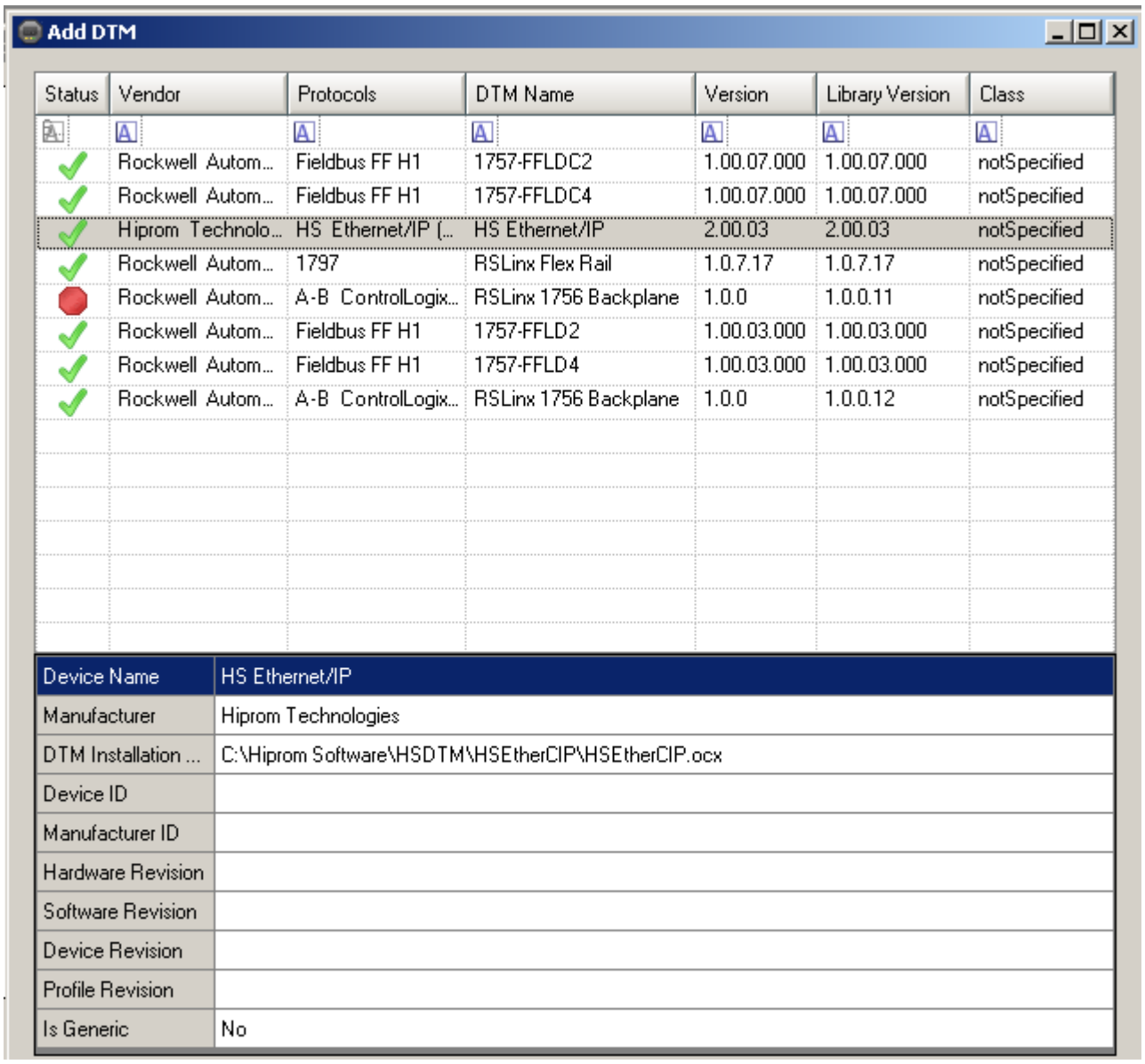
5. Close the DTM catalog and Set up the DTM network path under tasks.



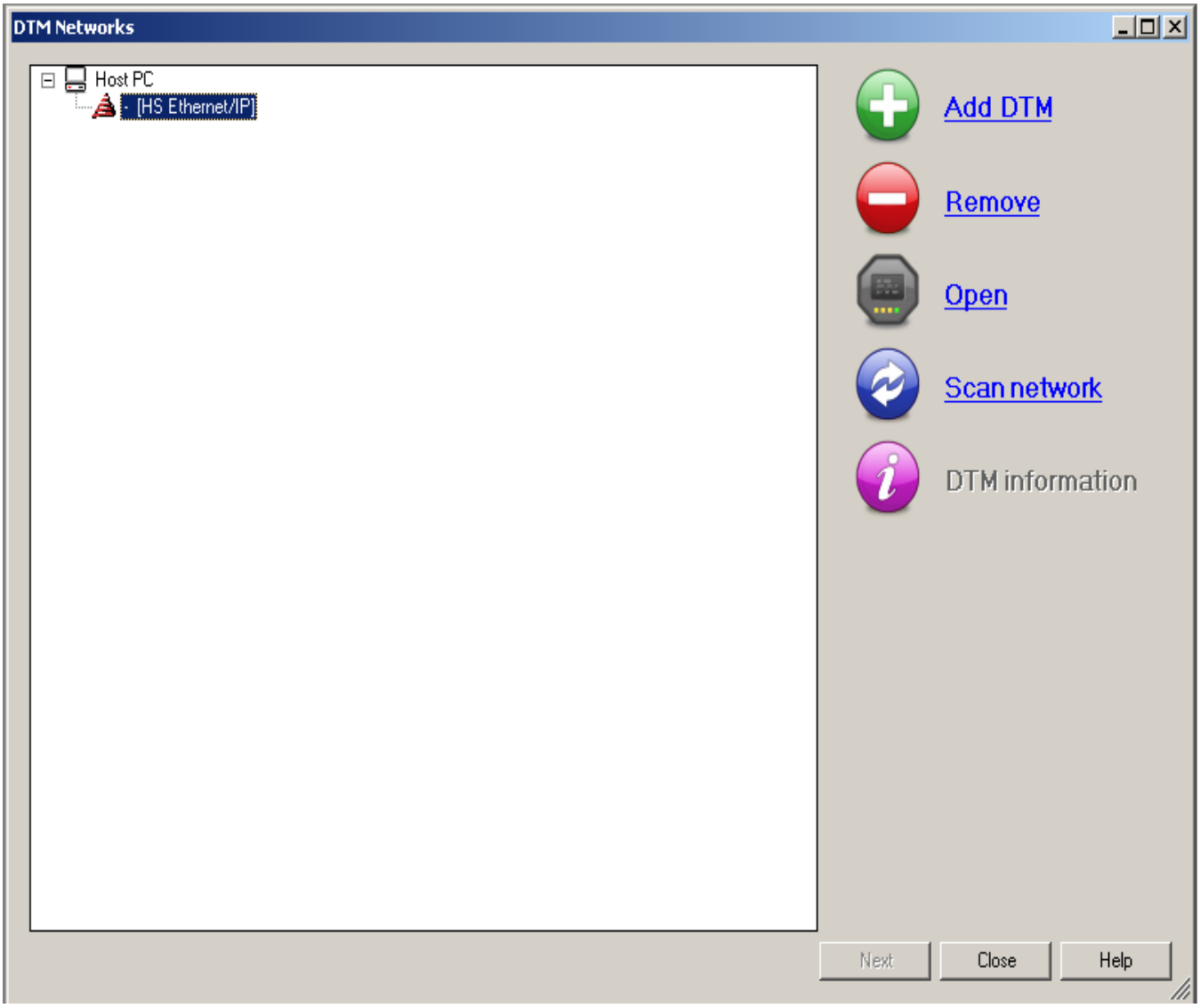
6. Select the DTM network, and then click. .



7. Select the network DTM and right click to Add the DTM to the HSnetwork.

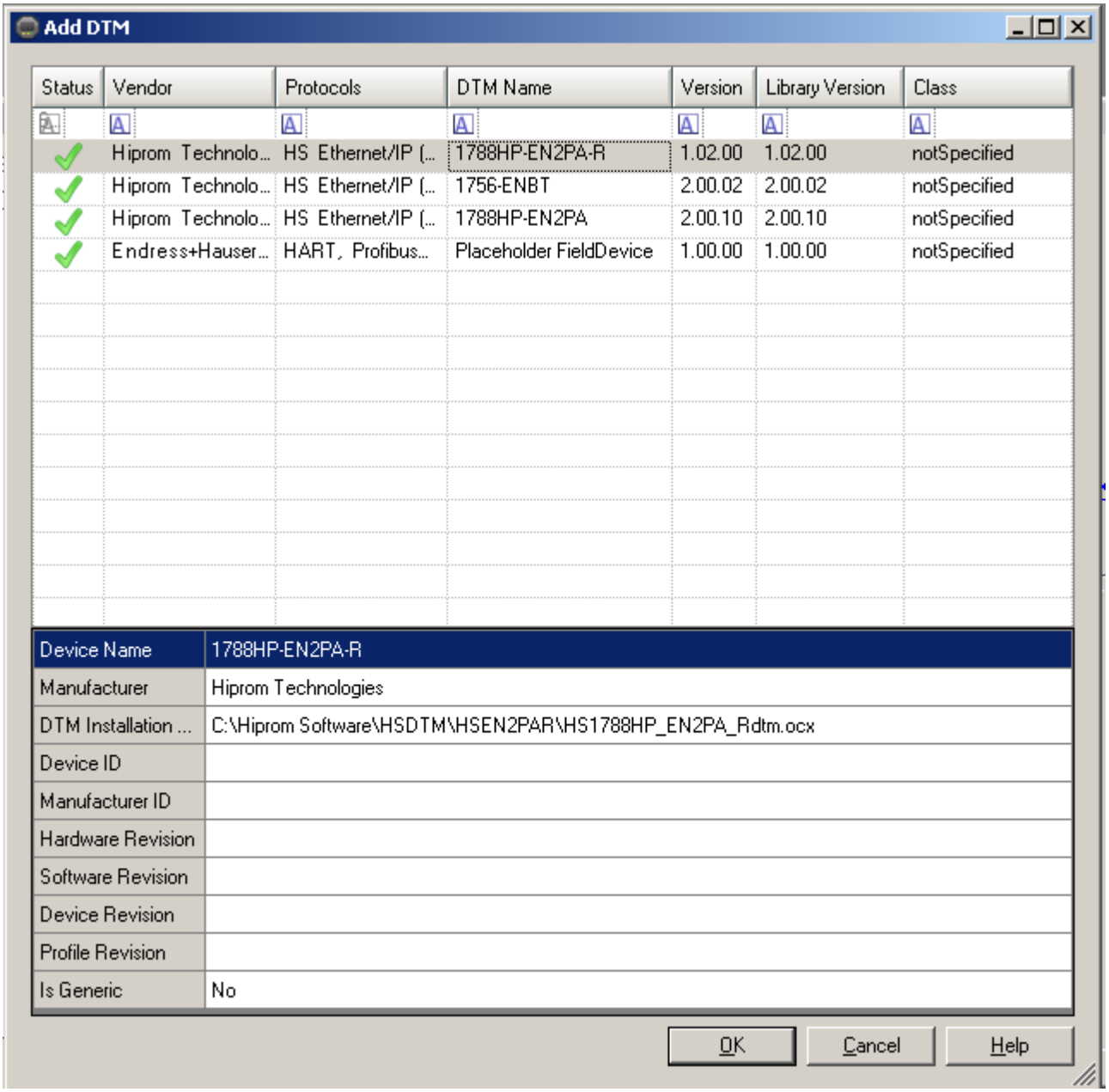

Add DTM
Status
Vendor
Protocols
DTM Name
Version
Library Version
Class
Rockwell Autom... Fieldbus FF H1 1757-FFLDC2 1.00.07.000 1.00.07.000 notSpecified
Rockwell Autom... Fieldbus FF H1 1757-FFLDC4 1.00.07.000 1.00.07.000 notSpecified
Hiprom Technolo... HS Ethernet/IP (... HS Ethernet/IP 2.00.03 2.00.03 notSpecified
Rockwell Autom... 1797 RSLinx Flex Rail 1.0.7.17 1.0.7.17 notSpecified
Rockwell Autom... A-B ControlLogix... RSLinx 1756 Backplane 1.0.0 1.0.0.11 notSpecified
Rockwell Autom... Fieldbus FF H1 1757-FFLD2 1.00.03.000 1.00.03.000 notSpecified
Rockwell Autom... Fieldbus FF H1 1757-FFLD4 1.00.03.000 1.00.03.000 notSpecified
Rockwell Autom... A-B ControlLogix... RSLinx 1756 Backplane 1.0.0 1.0.0.12 notSpecified
Device Name HS Ethernet/IP
Manufacturer Hiprom Technologies
DTM Installation ... C:\Hiprom Software\HSDTM\HSEtherCIP\HSEtherCIP.ocx
Device ID
Manufacturer ID
Hardware Revision
Software Revision
Device Revision
Profile Revision
Is Generic No

8. Select the HS Ethernet network and click OK.

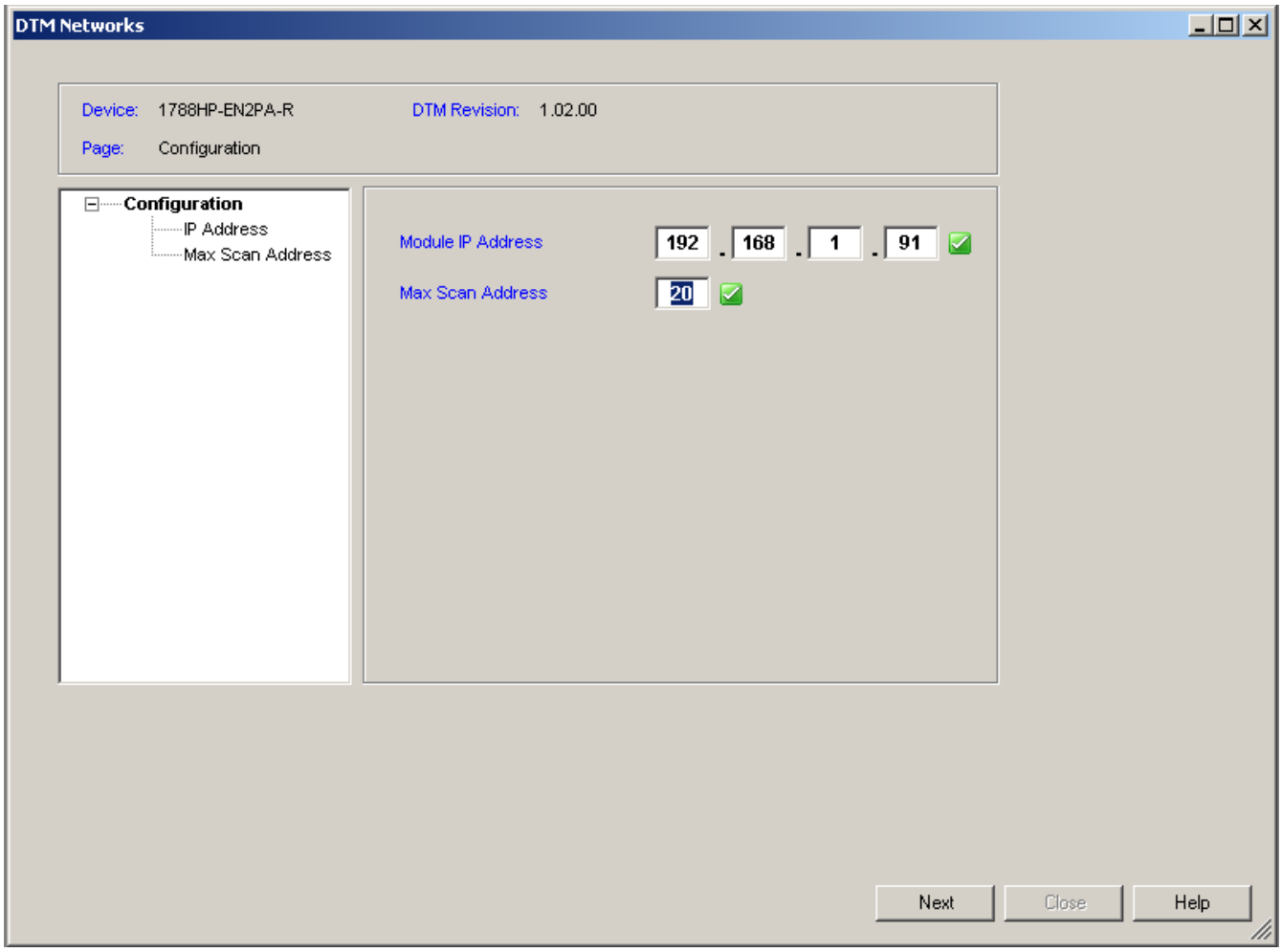


9. Select the network then select Add DTM.

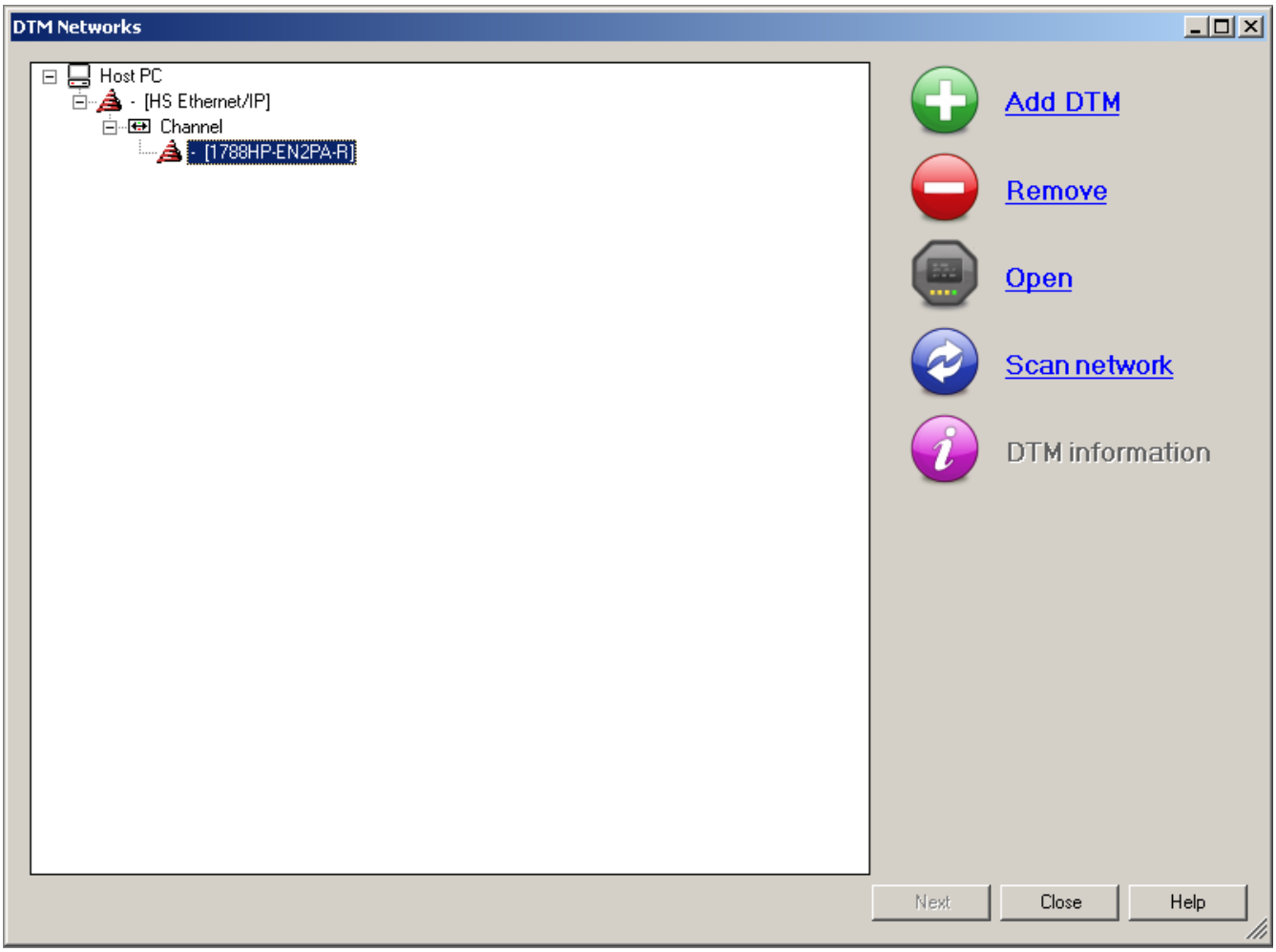
10. Select 1788-EN2PAR. Click OK



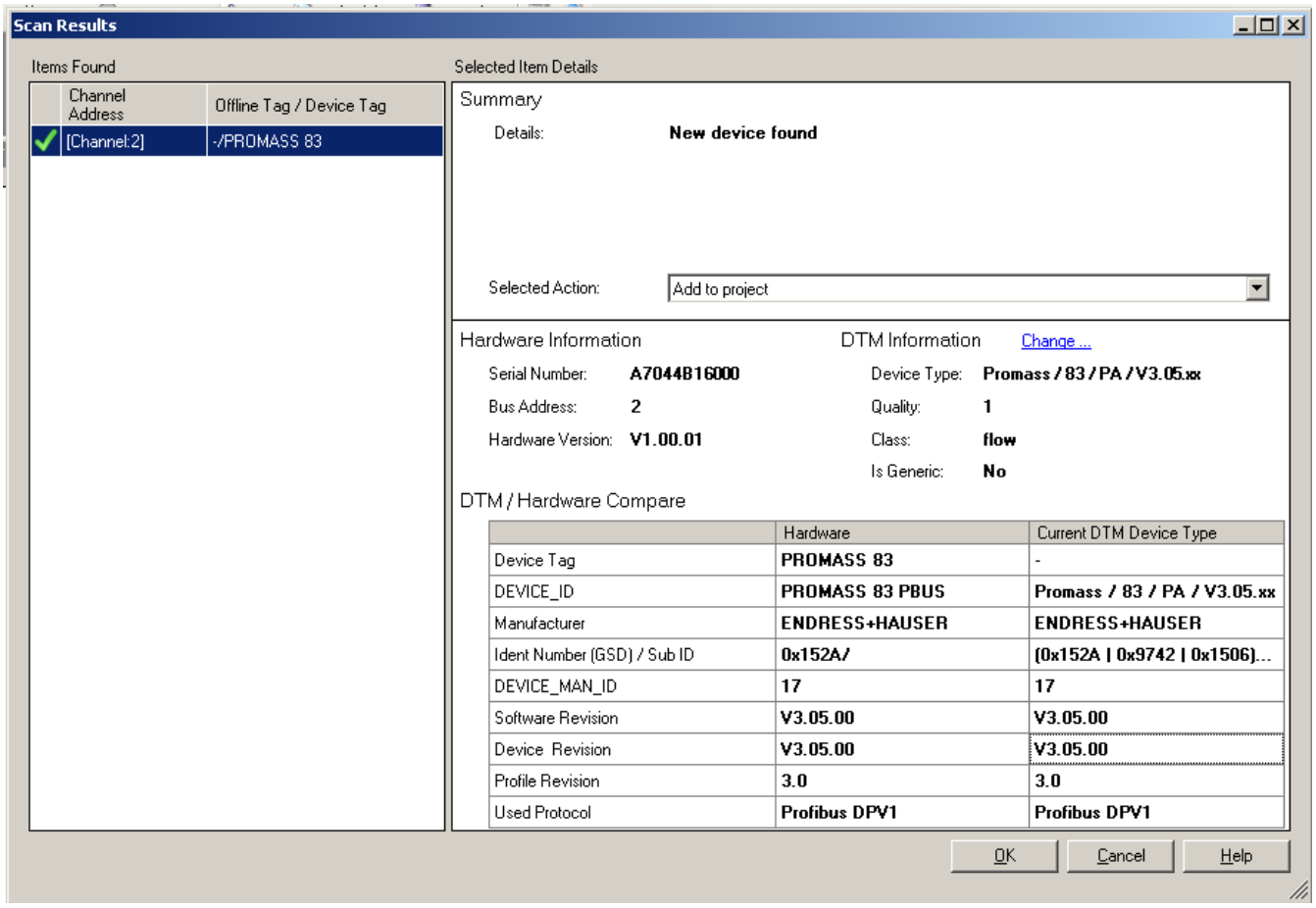
11. Add the IP addresses and press Enter after entry.



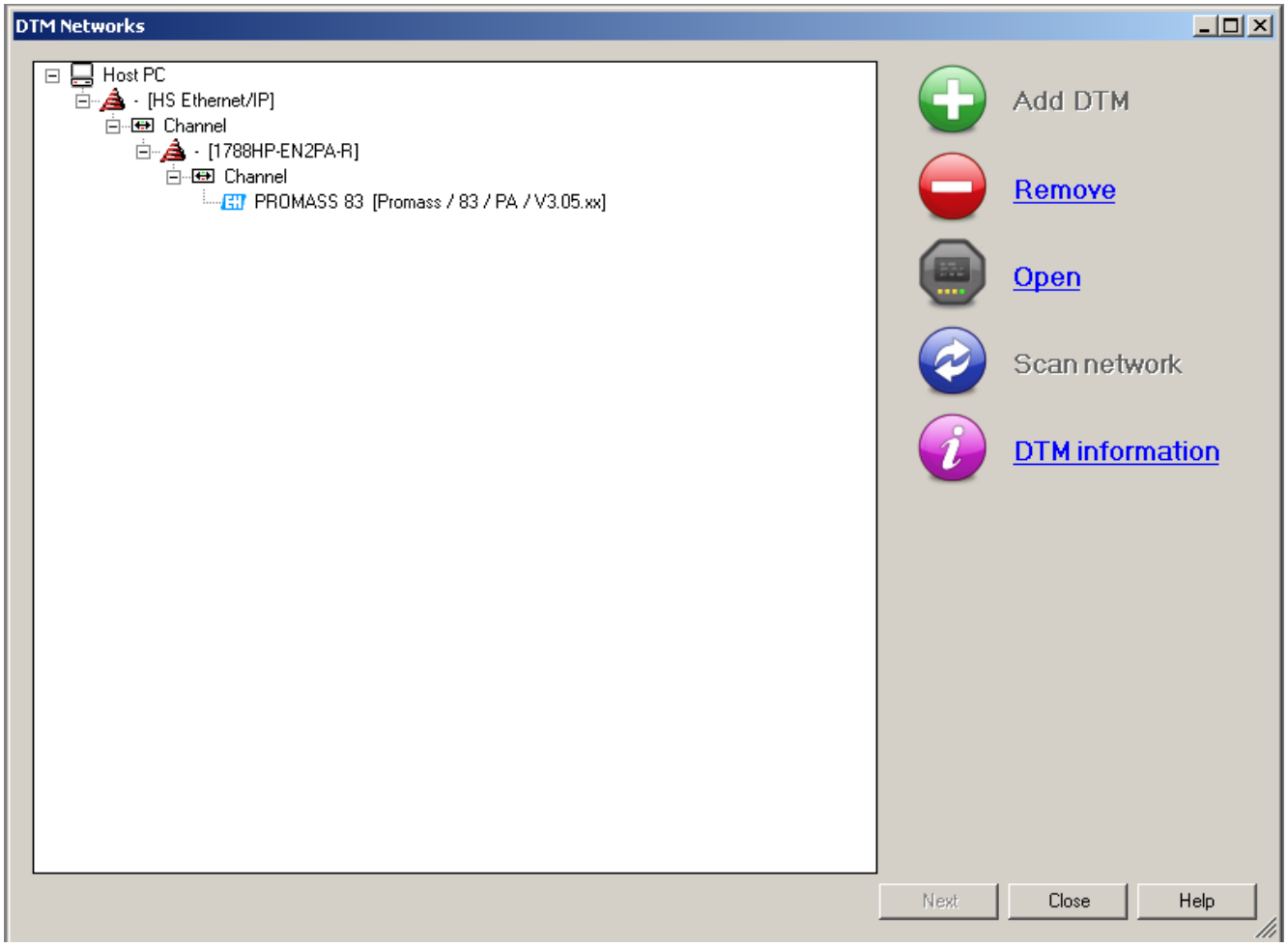
12. Click Next.



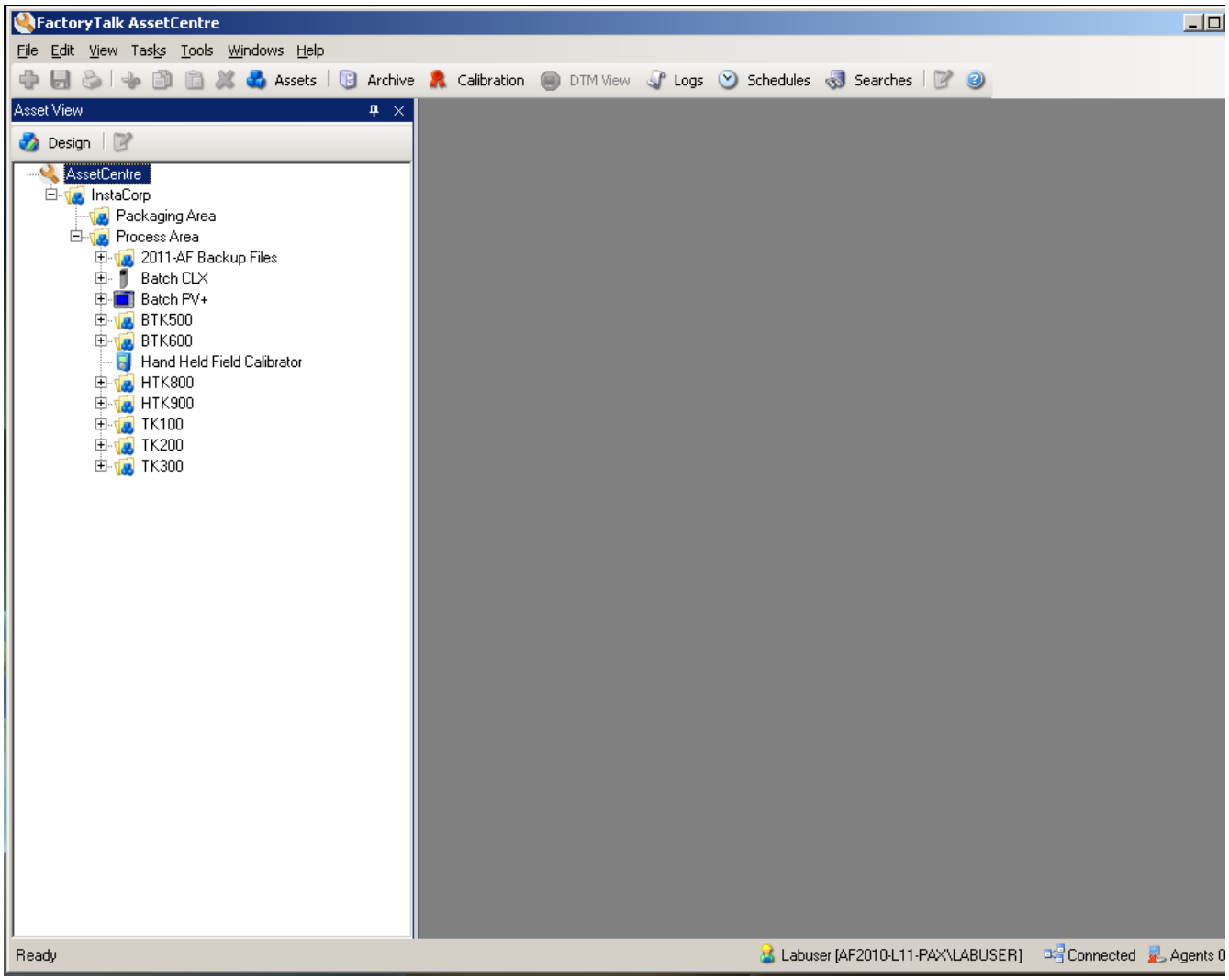
13. Click Scan Network. The following screen should appear.



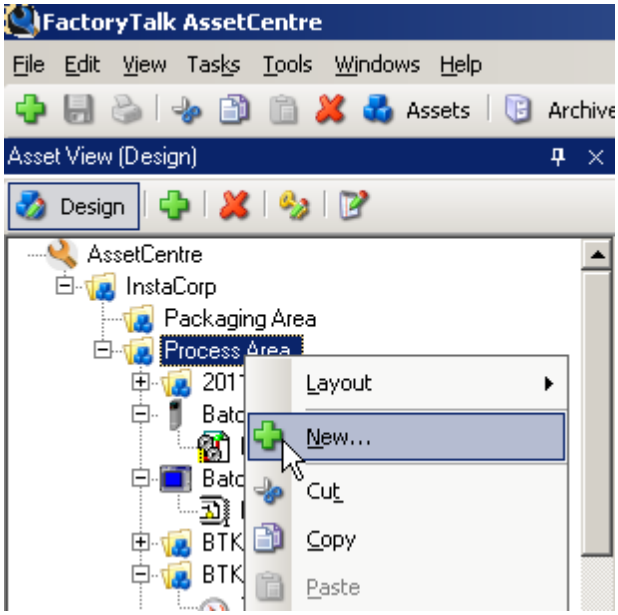
14. Verify the information, Click OK. Then click Close.



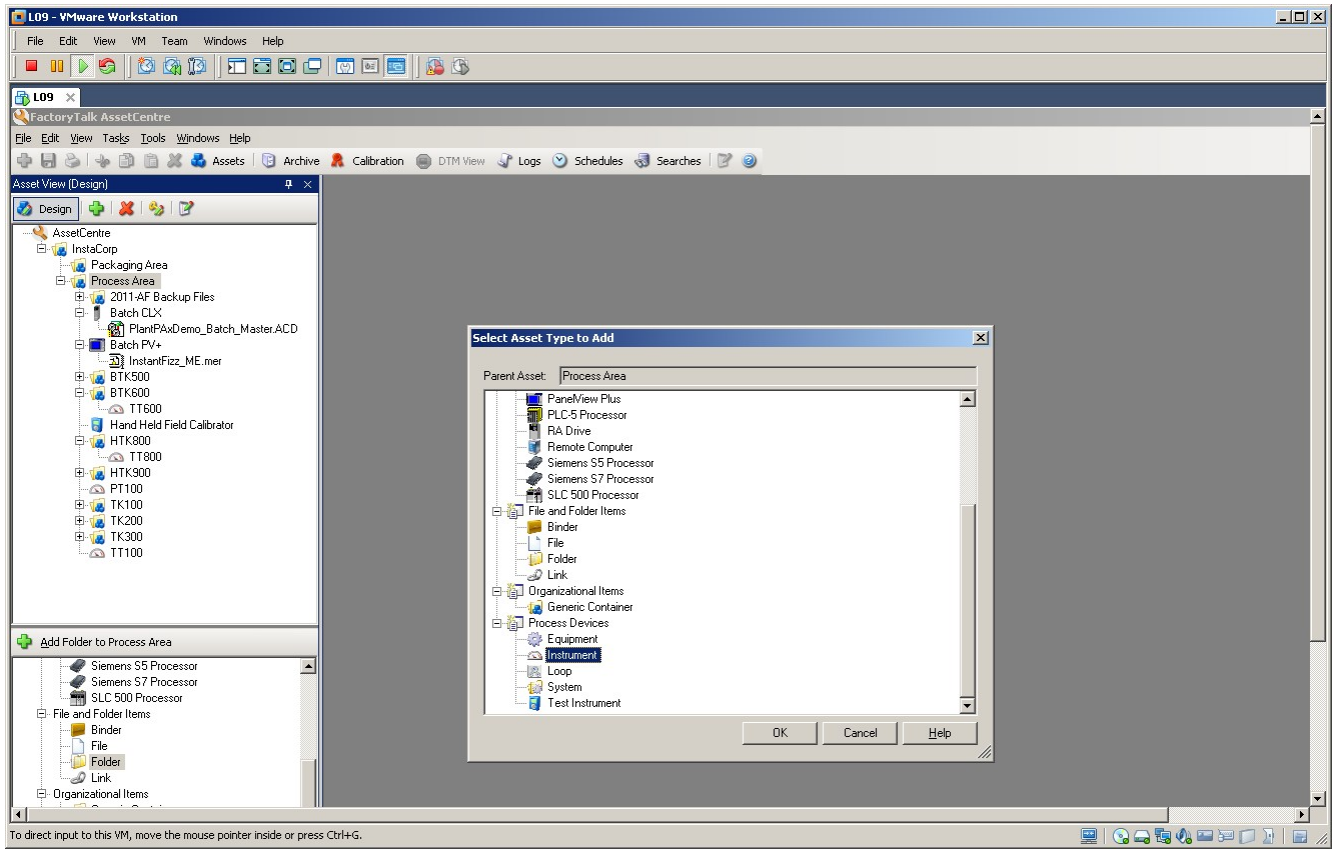
15. Select and click Design Mode from the AssetCentre Asset view then select Process Area..



16. Right Click then select New and click.

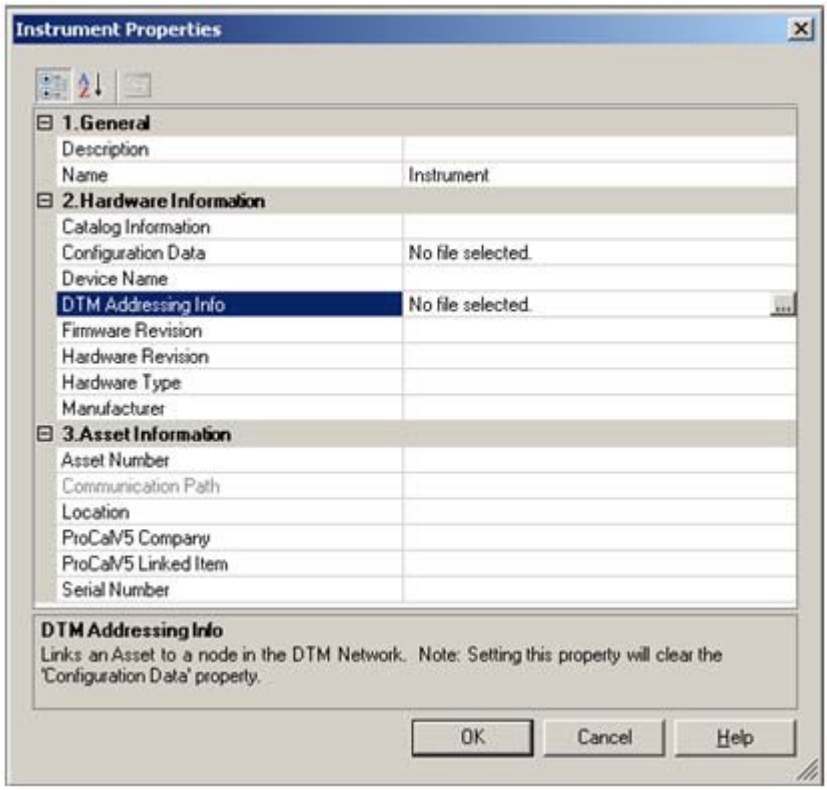


17. From the process tree select Instrument.

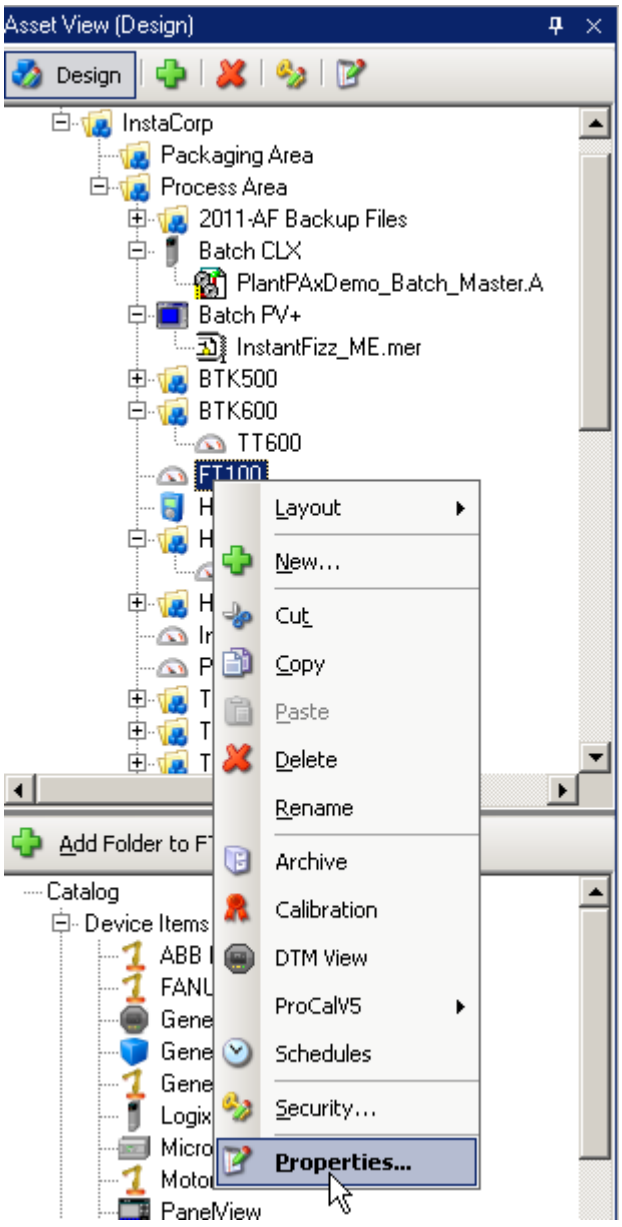


18. Click OK.

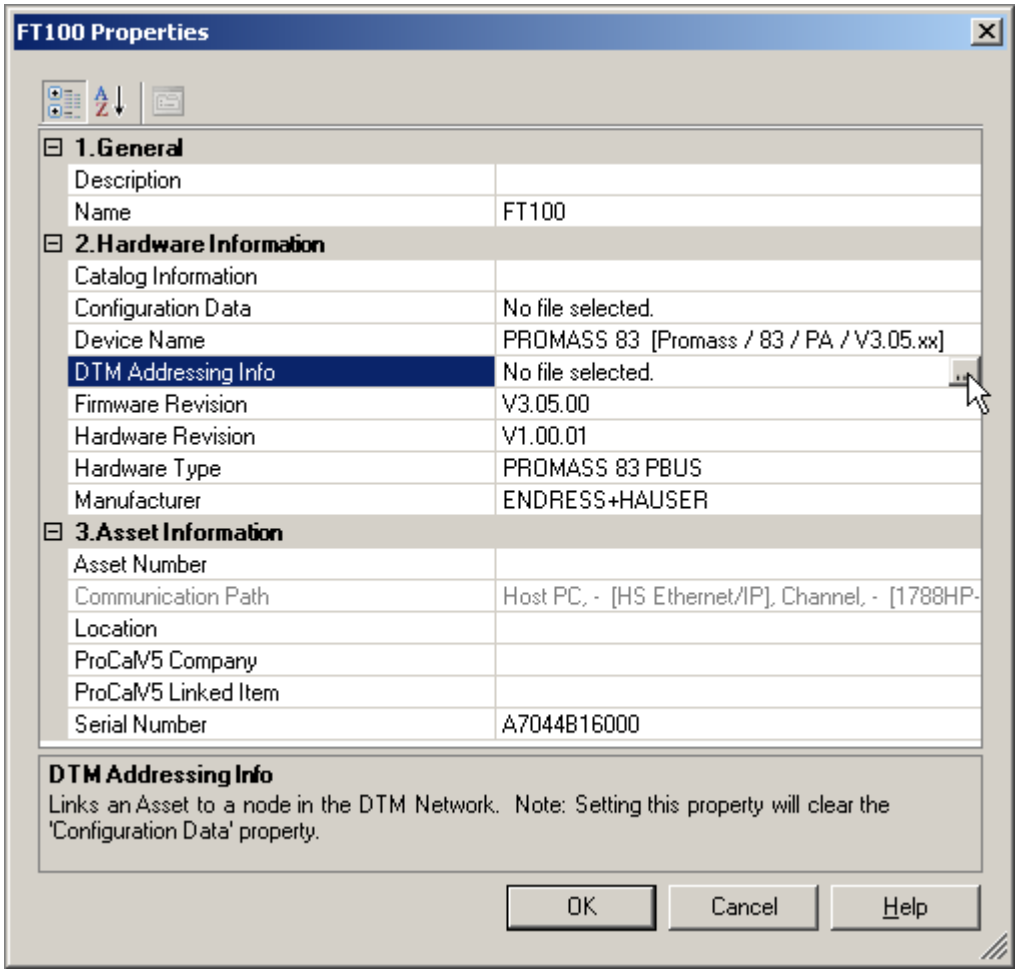
19. The screen should appear. Enter a Name (Example: FT100) and click OK.



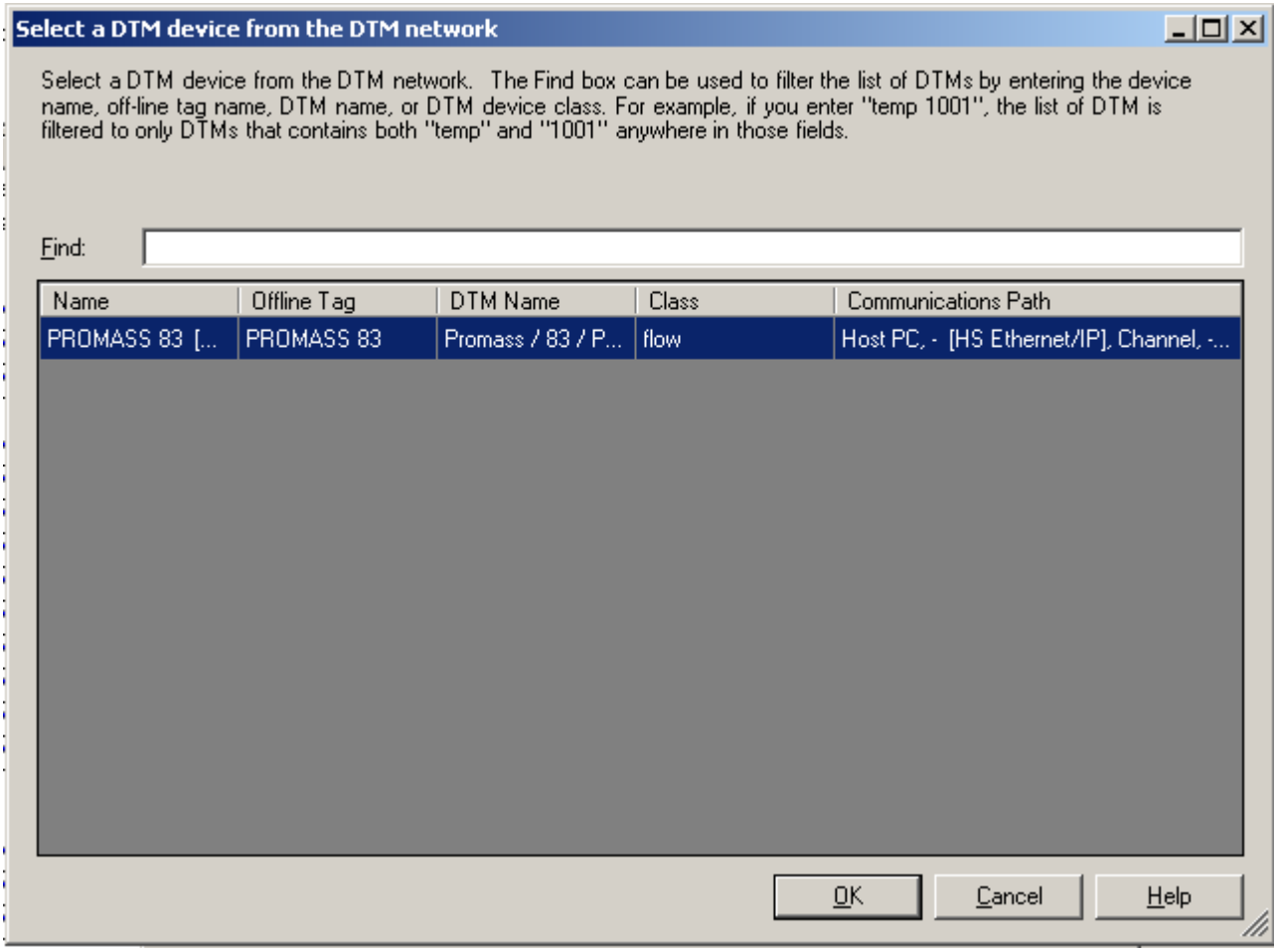
20. Right-click on FT100 or (other name), select Properties and click.



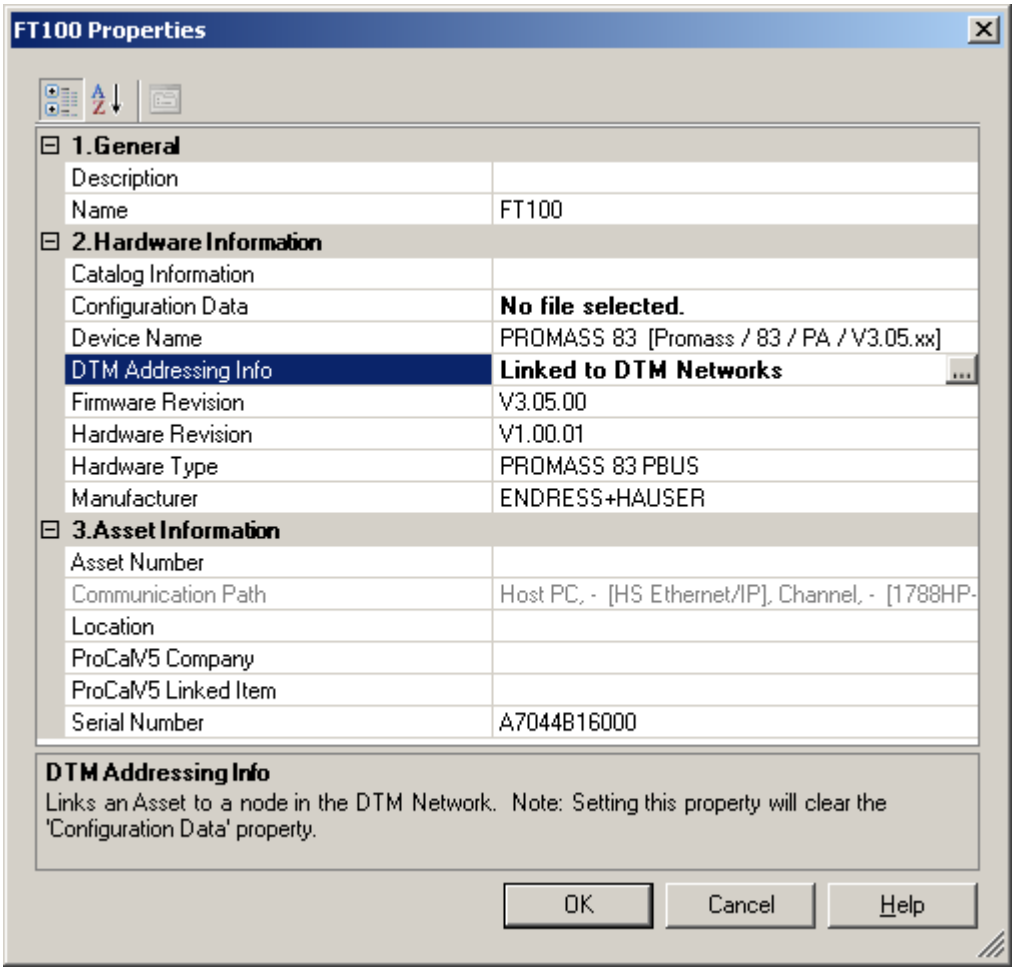
21. Select DTM addressing info and click the ... button on the right hand side of the screen.



22. From the following screen highlight Promass 83.

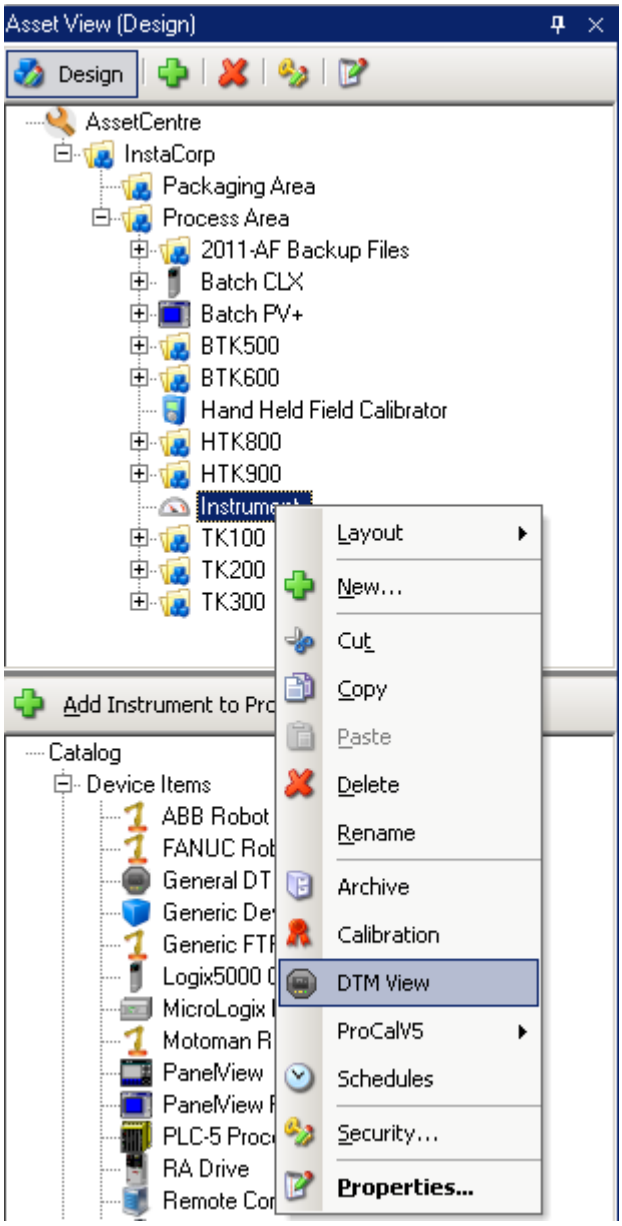

Select a DTM device from the DTM network
Select a DTM device from the DTM network. The Find box can be used to filter the list of DTMs by entering the device name, off-line tag name, DTM name, or DTM device class. For example, if you enter "temp 1001", the list of DTM is filtered to only DTMs that contains both "temp" and "1001" anywhere in those fields.
Find:
Name
Offline Tag
DTM Name
Class
Communications Path
PROMASS 83 [...
PROMASS 83
Promass / 83 / P...
flow
Host PC, - [HS Ethernet/IP], Channel, -...
OK
Cancel
Help

23. Click OK and the following screen should appear.

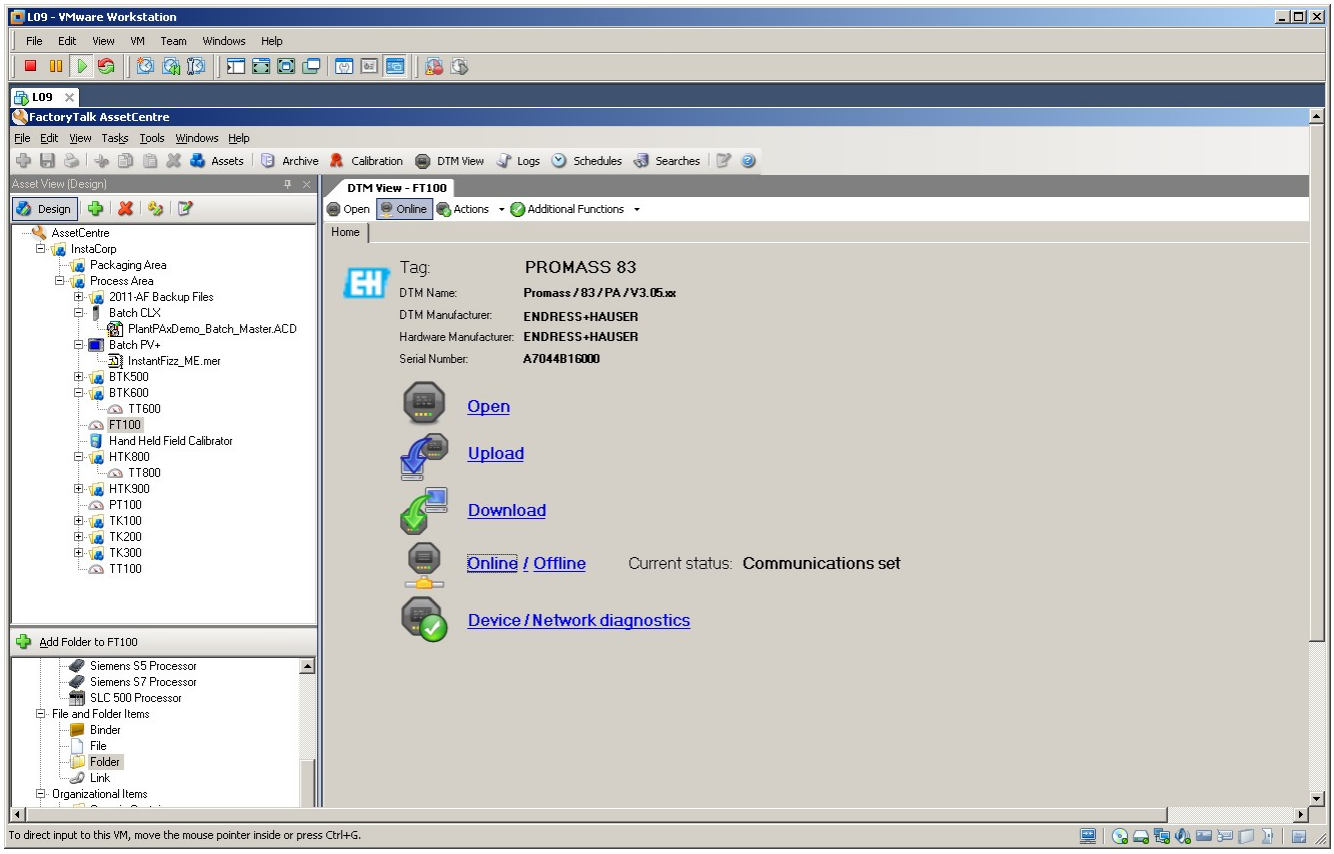


24. Click OK.

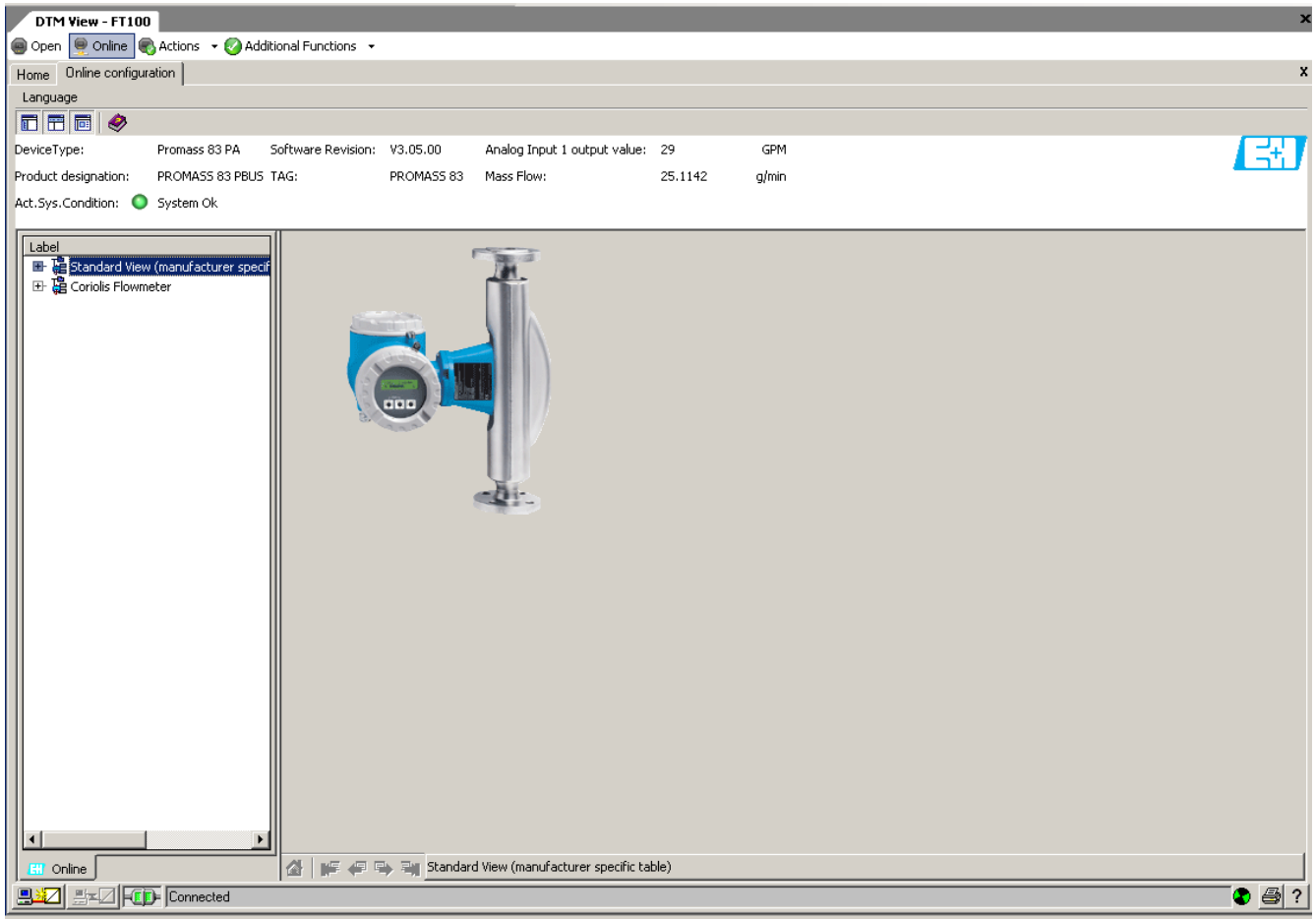
25. Highlight the Instrument and select DTMView.



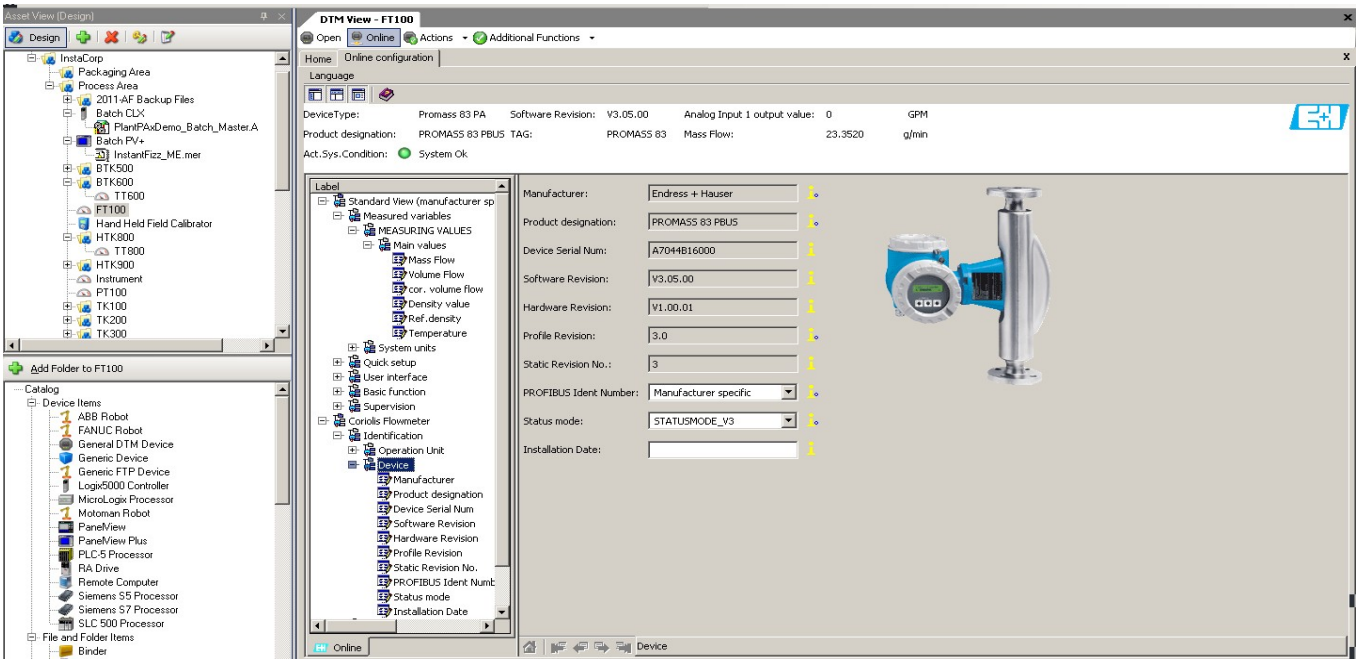
A screen showing the instrument's data should appear.



26. Select the Online view and open. The device screen and data should appear. Make any necessary changes to the settings.

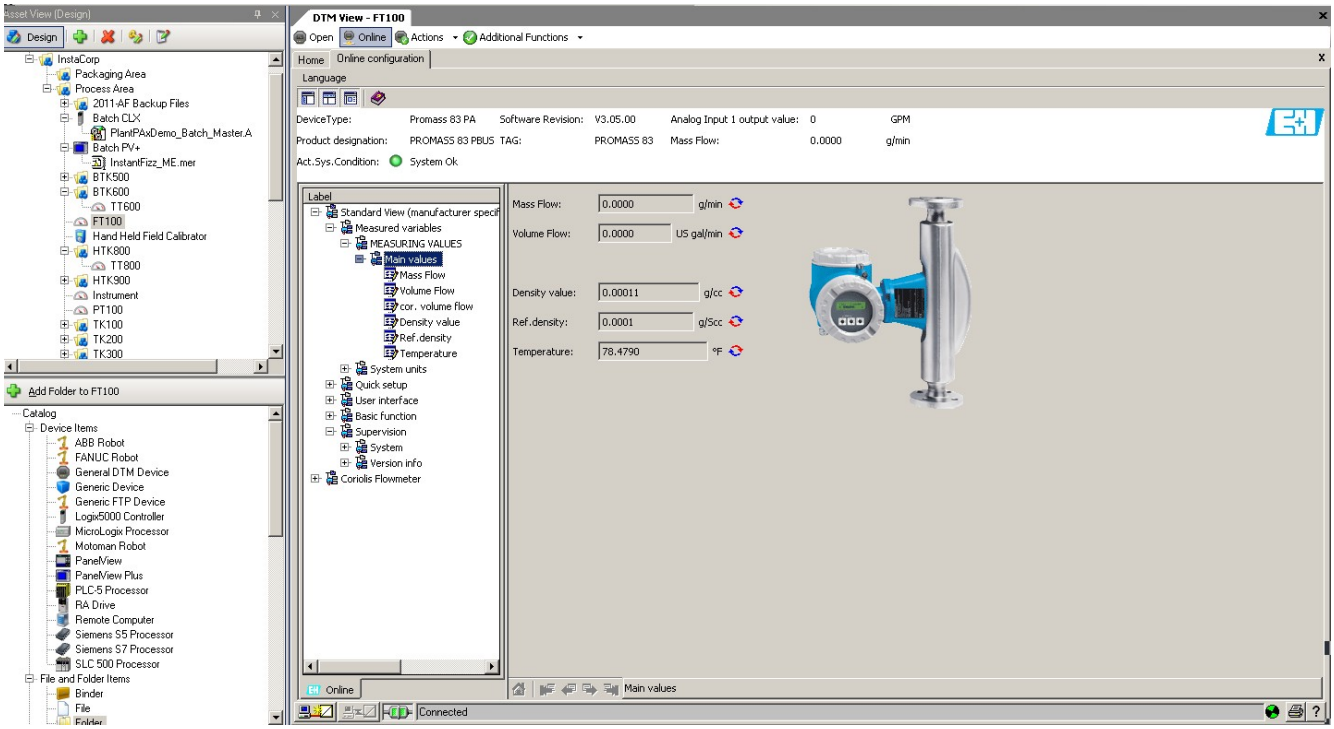


27. Go to Standard View.

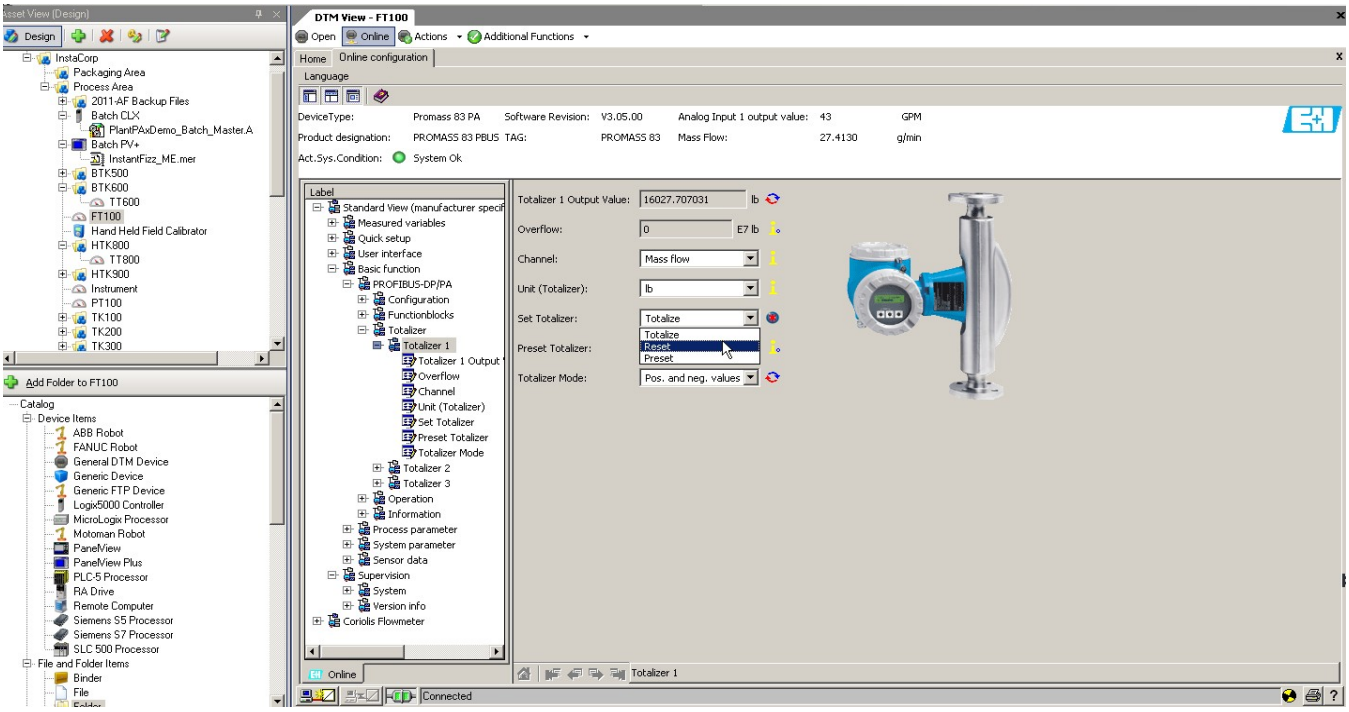


28. Go Online and select Measuring Values.

29. Select Main Value.



30. Under Basic Function select the Totalizer and Reset if desired.



31. Close the DTMs and AssetCentre.

32. Open RSLogix 5000 and open the Project.

33. If desired, go Online and open the Controller Tag database. Select Promass 83 to display device, status and diagnostic data.

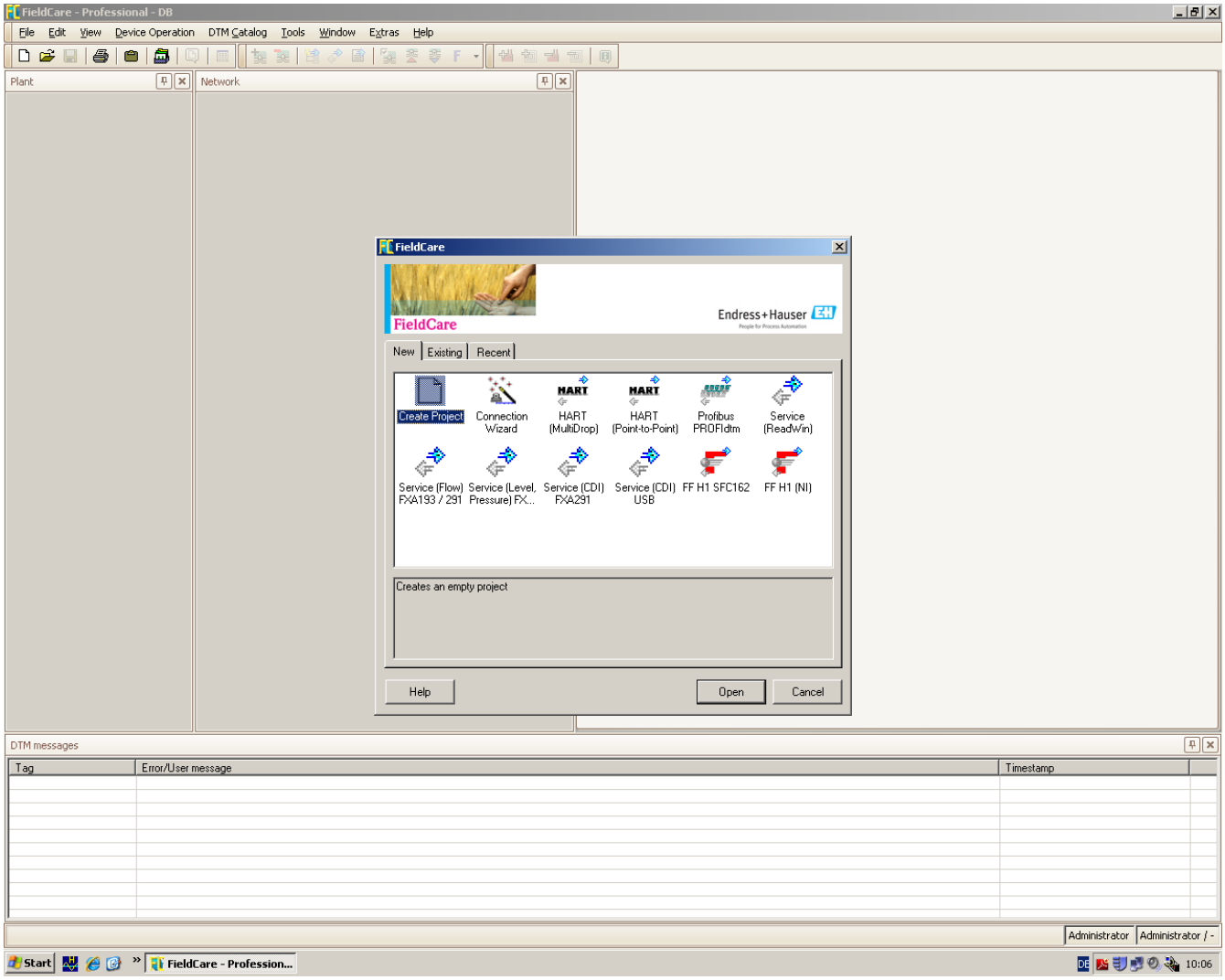
Connect to, Monitor and Configure the Instrument via FieldCare

FieldCare is the FDT-based plant asset management software tool that lets you configure the intelligent field instruments.

Note: Before starting make sure the DTM's have been imported and installed for the Hiprom Communication linking device and the E+H Instrument. To access the DTMs and other software download them from the Hiprom and or E+H websites.

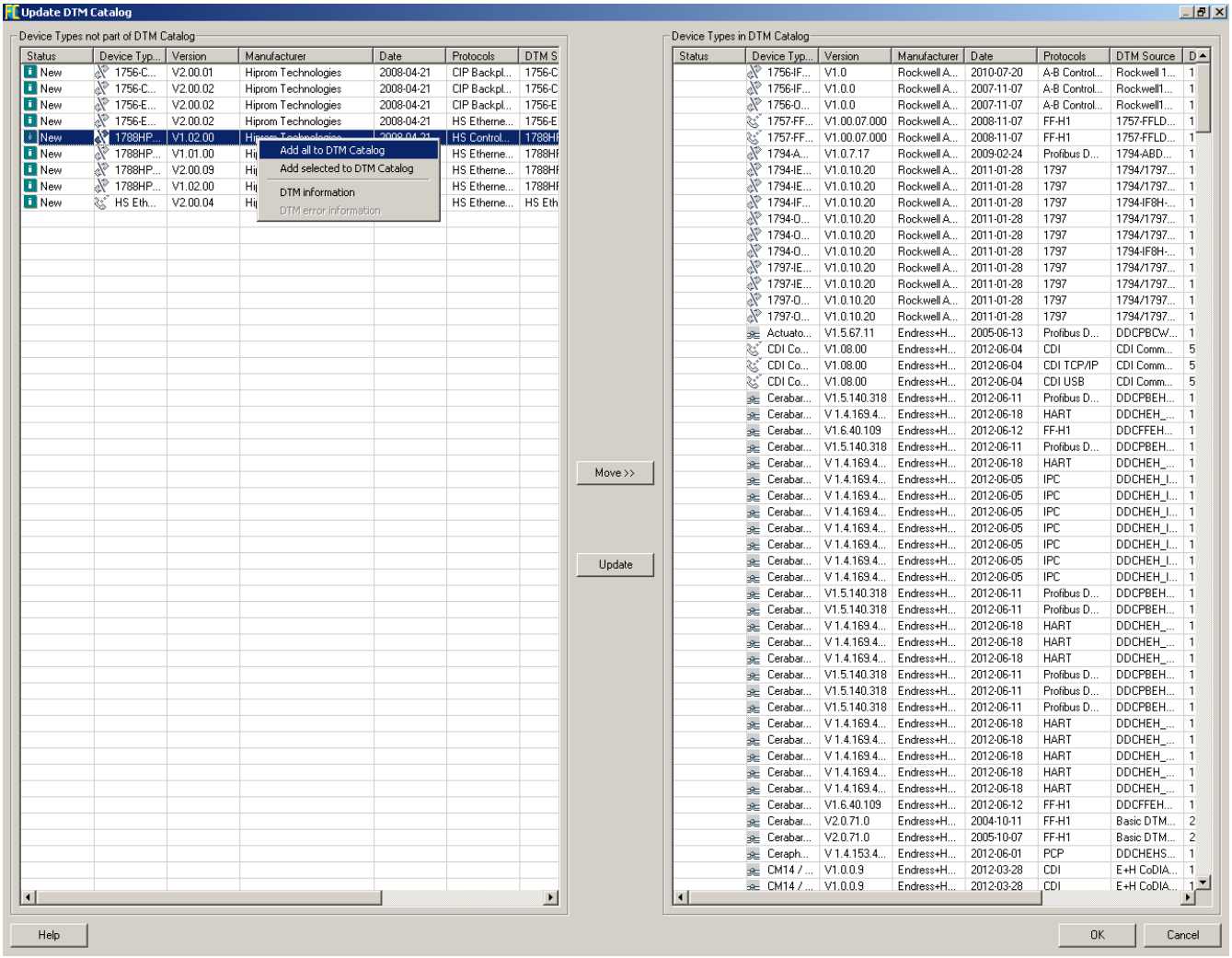
1. Install the appropriate DTMs.

2. Start FieldCare and open a new project.



3. Choose the DTM Catalog menu and click update.

4. If there are DTMs listed in the dialog box´s left pane, select desired DTMs and click Move or choose “Add all to DTM catalog”.

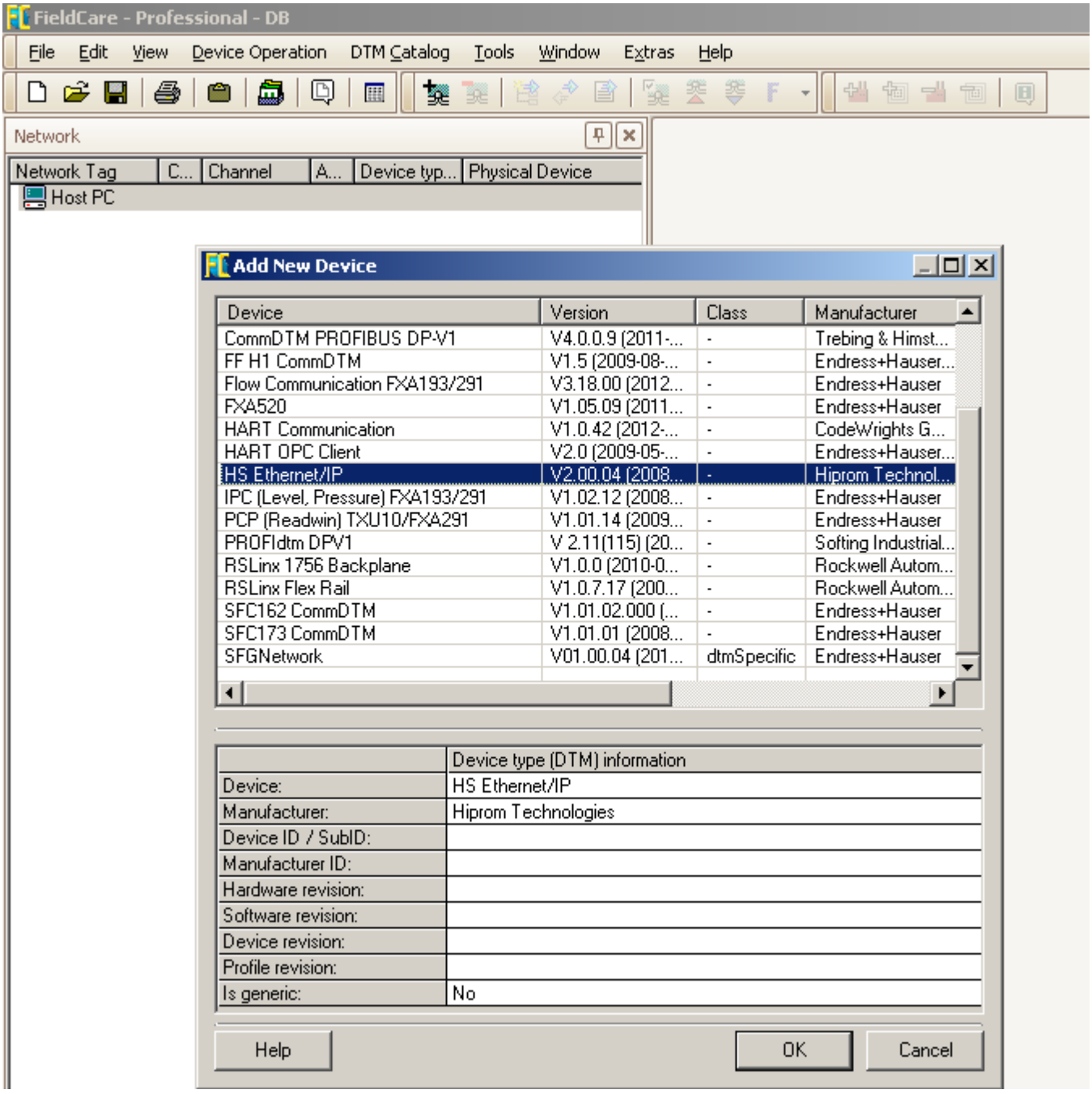


If you do not find the desired DTMs, or if the left pane of the dialog box is empty, click Update. FieldCare searches for DTMs installed on your computer. After search, found DTMs are added to the dialog box´s left pane.

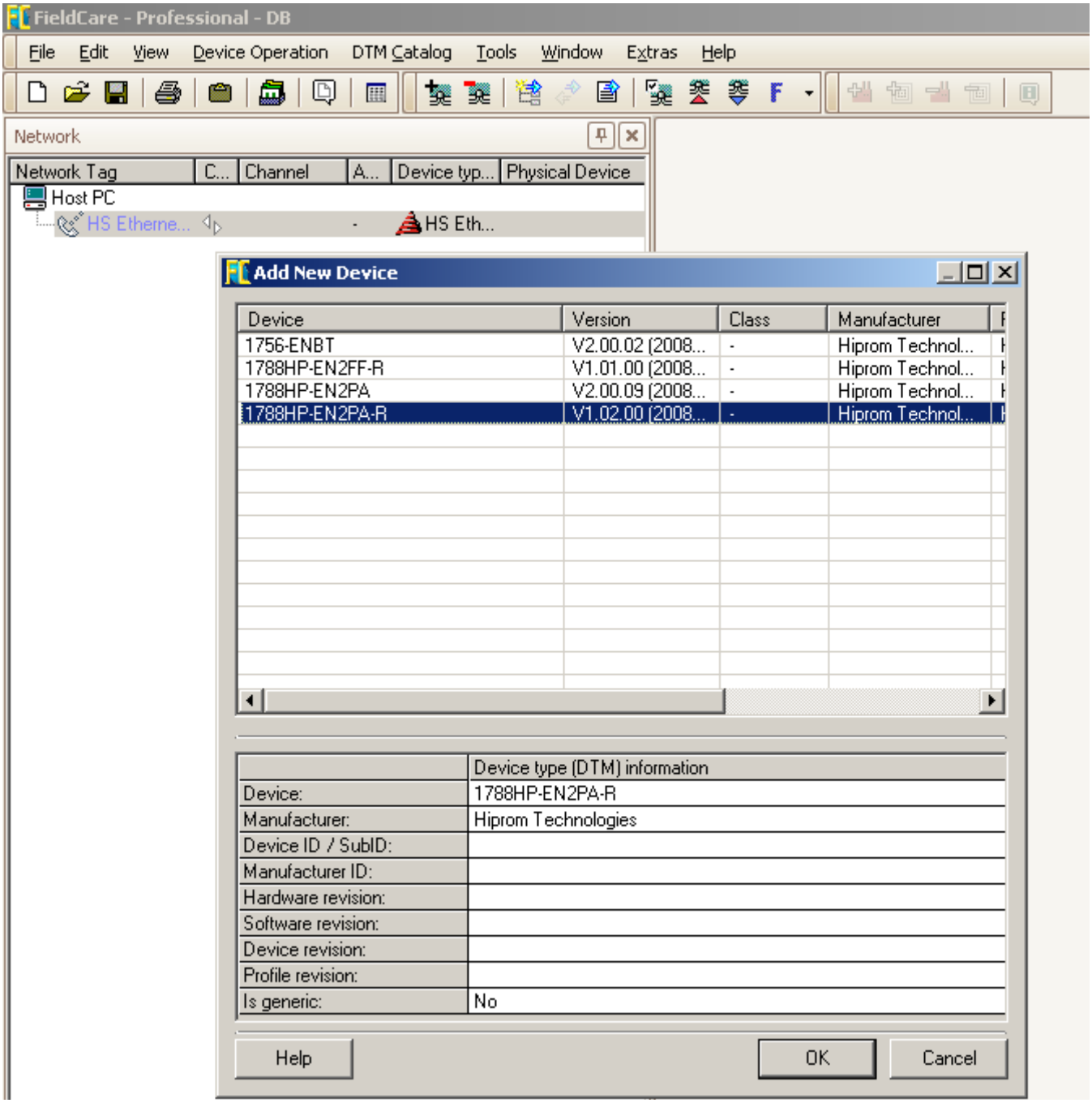
If necessary, to remove DTMs, select the desired DTMs in right pane and click Move.

5. Click OK to save your changes.

6. Click the Add Device icon, select HS EtherNet/IP DTM and click OK.

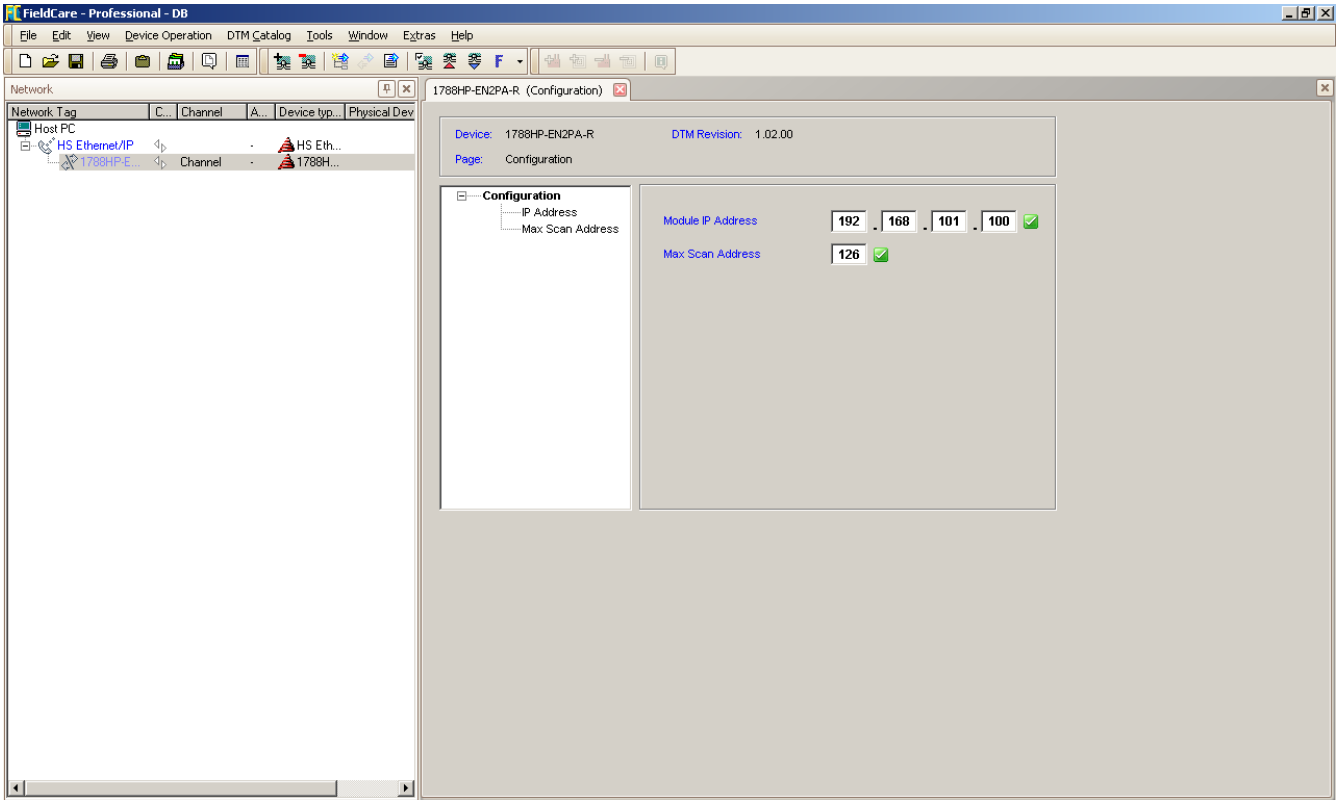

FieldCare - Professional - DB
File Edit View Device Operation DTM Catalog Tools Window Extras Help
Network
Network Tag C... Channel A... Device typ... Physical Device
Host PC
Add New Device
Device Version Class Manufacturer
CommDTM PROFIBUS DP-V1 V4.0.0.9 (2011-... - Trebing & Himst...
FF H1 CommDTM V1.5 (2009-08-... - Endress+Hauser...
Flow Communication FXA193/291 V3.18.00 (2012... - Endress+Hauser
FXA520 V1.05.09 (2011... - Endress+Hauser
HART Communication V1.0.42 (2012-... - CodeWrights G...
HART OPC Client V2.0 (2009-05-... - Endress+Hauser...
HS Ethernet/IP V2.00.04 (2008... - Hiprom Technol...
IPC (Level, Pressure) FXA193/291 V1.02.12 (2008... - Endress+Hauser
PCP (Readwin) TXU10/FXA291 V1.01.14 (2009... - Endress+Hauser
PROFIdtm DPV1 V 2.11(115) (20... - Softing Industrial...
RSLinx 1756 Backplane V1.0.0 (2010-0... - Rockwell Autom...
RSLinx Flex Rail V1.0.7.17 (200... - Rockwell Autom...
SFC162 CommDTM V1.01.02.000 (... - Endress+Hauser
SFC173 CommDTM V1.01.01 (2008... - Endress+Hauser
SFGNetwork V01.00.04 (201... dtmSpecific Endress+Hauser
Device type (DTM) information
Device: HS Ethernet/IP
Manufacturer: Hiprom Technologies
Device ID / SubID:
Manufacturer ID:
Hardware revision:
Software revision:
Device revision:
Profile revision:
Is generic: No
Help
OK
Cancel

7. Click on HS EtherNet/IP- DTM. Click the Add Device icon, select 1788-EN2PA-R and click OK.



8. To configure the 1788-EN2PA-R, double click on 1788-EN2PA-R in the left pane.

9. Enter the 1788-EN2PA-R IP address and the Max Scan Address.



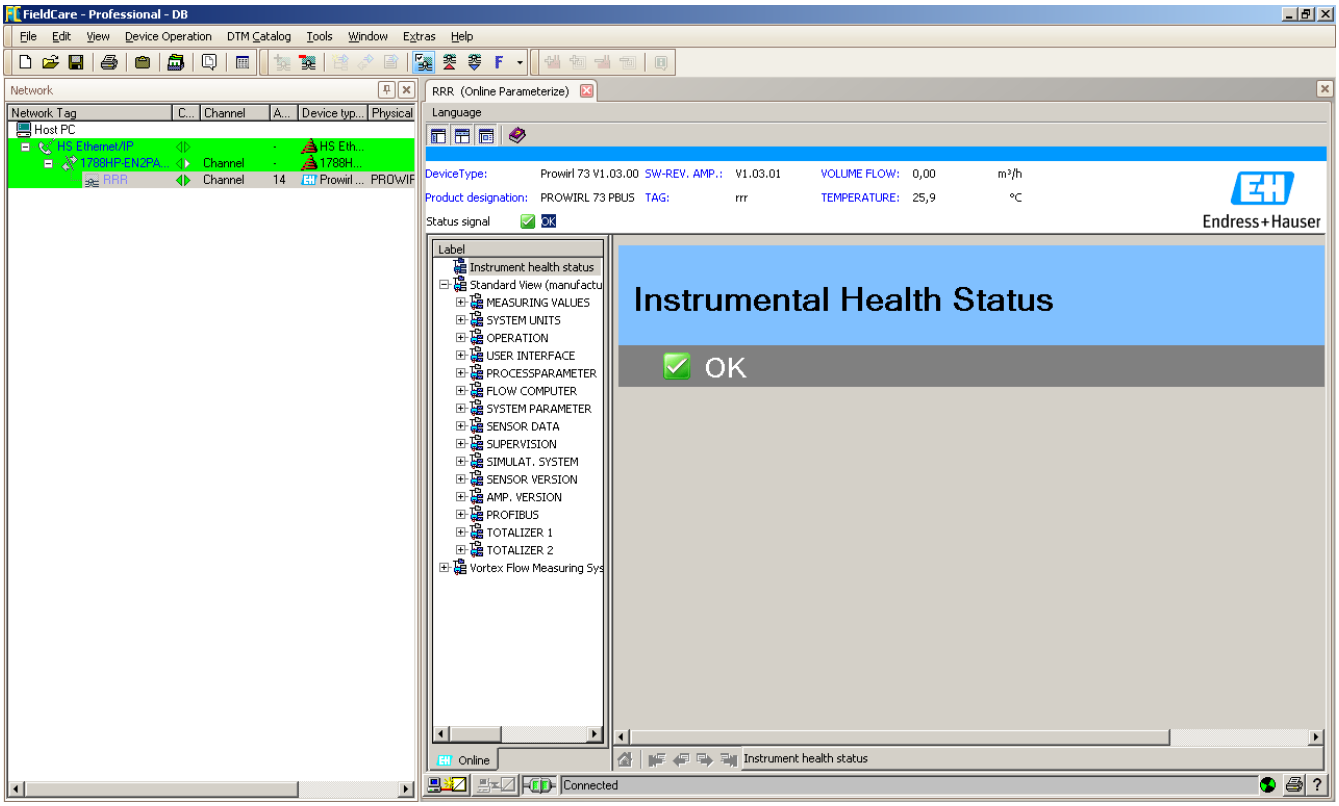
10. Click the Create Network icon.

11. When prompted click OK. The Com DTM now scans the entire PROFIBUS PA network behind the 1788-EN2PA-R and searches for the right DTM. If the right DTM is installed, the instrument comes up in the Explorer view on the left pane.

    If only one DTM is added to the network, the Software automatically goes online. Otherwise a warning occurs that must be confirmed. To switch this behavior off, in the Explorer- context- menu Extras/ Options, select After Scanning within Page Scanning.

12. In an open FieldCare project, right-click on the instrument in the left pane and select Connect.

13. Double-click on the instrument in the left pane. The Online parameterization window appears with the Instrument Health Status. The following example shows a Prowirl field instrument. Your screens may vary depending on the field instrument.



14. You can right-click now on the instrument in the left pane to access other views and data, e.g. observe, reset or offline parameterization.

Visualization

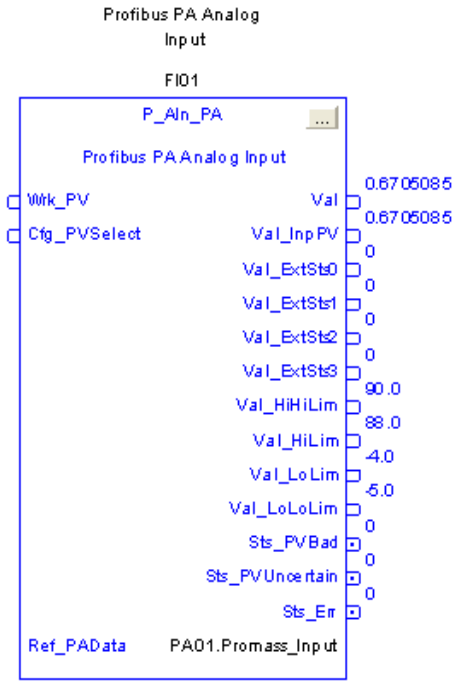
In order to monitor the instruments using the pre-designed faceplates, the EN2PAR must be set up as specified in this integration document and the manual. We also suggest developing a similar configuration to the one included in the RSLogix 5000 project provided by Rockwell Automation. The controller exchanges data between the devices, and the FactoryTalk View SE faceplates notify personnel what is happening in the plant.

The following information summarizes the Add-On Instructions and faceplates. See Additional ResourcesAdditional Resources for more detailed information.

Add-On Instructions

An Add-On Instruction exchanges data between each process variable located in the process device and the faceplate installed on a display. The name of the specific instance of the Add-On Instruction becomes the link from the actual instrument to the faceplate on the graphic.

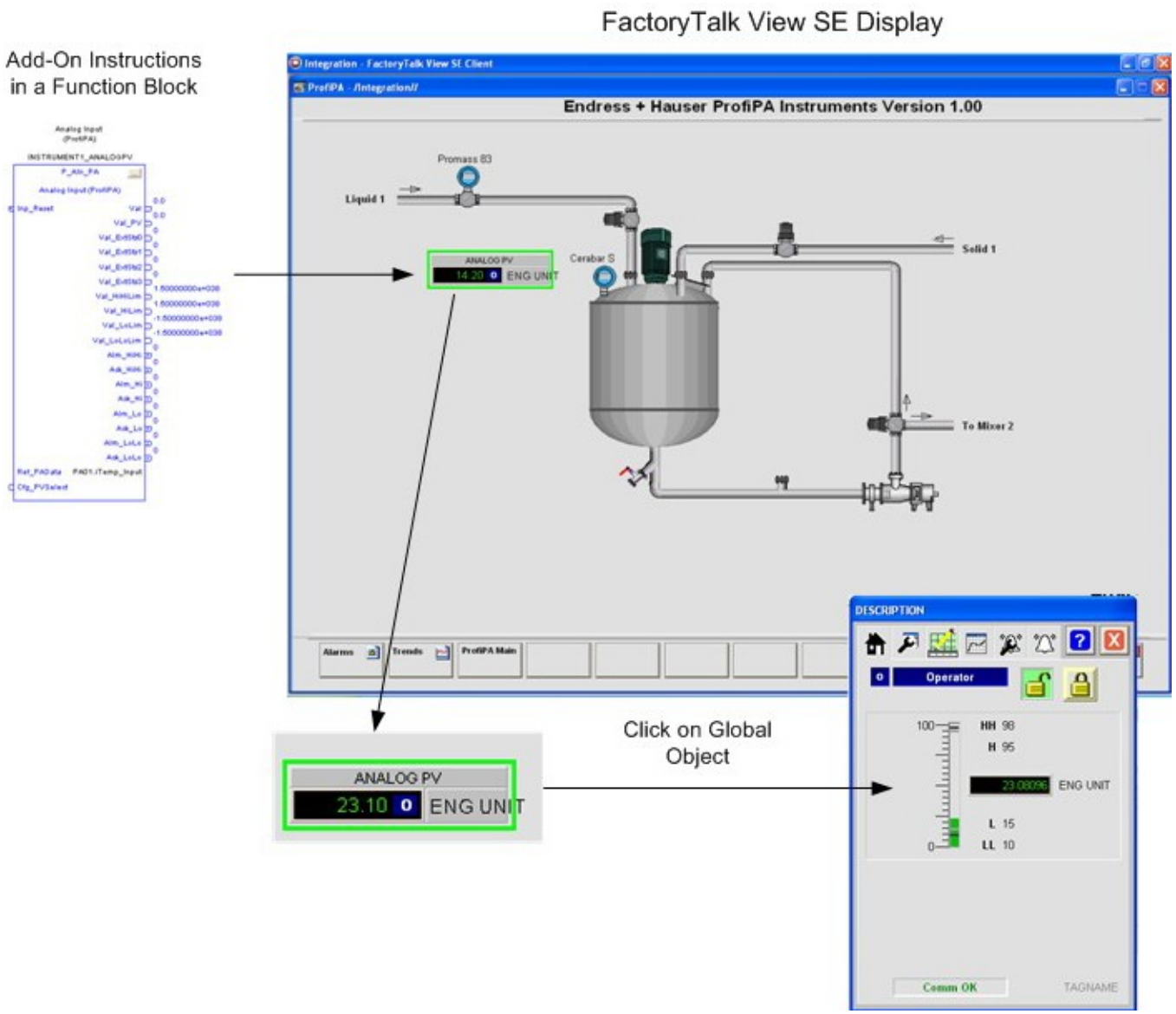
Structured input data for each field instrument.



IMPORTANT The P_AIn_PA Add-On Instruction uses embedded P_MODE and P_ALARM Add-On Instructions. These embedded Add-On Instructions must already be in the project before importing the P_AIn_PA Add-On Instruction.

Global Object

A global object links the tag name to the faceplate, provides a touch area from which to launch the faceplate, and displays the process variables and alarms.

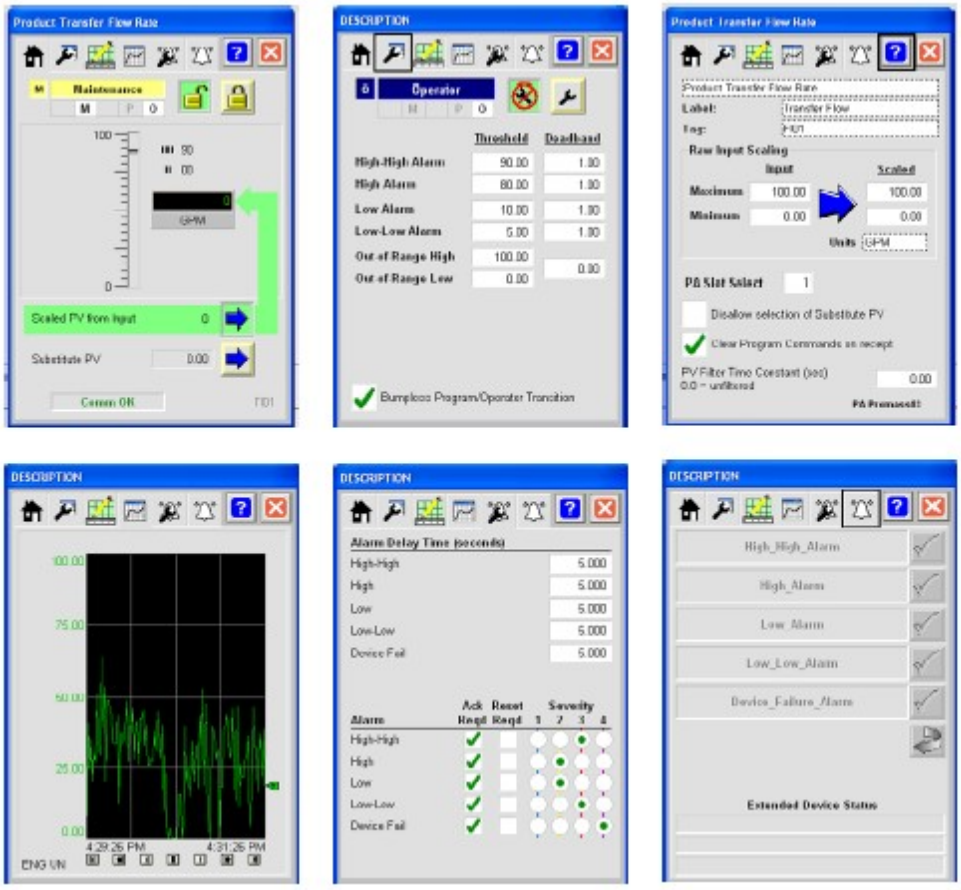


IMPORTANT A unique global object and faceplate are available for each field instrument due to each instrument having specific extended diagnostics.

Faceplates

The FactoryTalk View SE generic display provides a graphical representation of the instrument based on the information within each Add-On Instruction. Navigation buttons at the top of the faceplate change the information displayed. Status displays show information using a bar graph, numeric values, and trend displays. Other displays show specific alarms and warning indications.

Here are some examples of predesigned faceplates.



IMPORTANT A unique global object and faceplate is available for each field instrument due to the display of instrument-specific extended diagnostic information.

The faceplates provide the following from the device:

- PROFIBUS PA process values (PV) - first, second, third, fourth, fifth, sixth, seventh, eighth from instrument
- PV fault status (communication fault)

- PROFIBUS PA device Extended Status

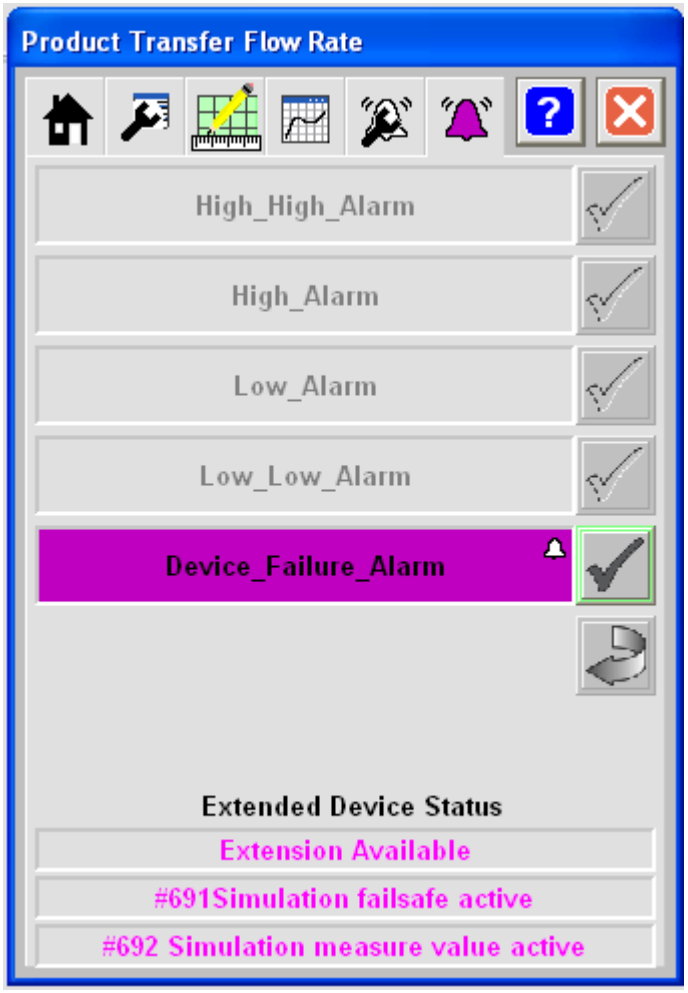
Configure the faceplates to provide the following:

- PROFIBUS PA PV range (minimum and maximum)
- Tag name
- Description
- Engineering units
- Mode (such as operator or program)
- High-high, high, low, low-low alarms
- Over-range and under-range alarms
- Alarm delay
- Alarm hysteresis

Extended Diagnostic Messages

PROFIBUS PA Extended Diagnostic Status provides information about an instrument when an instrument's transmitter or sensor is not running properly. It produces bit-based outputs that can be translated into specific error codes in

order to help maintenance personnel determine more specific details about abnormal conditions with PROFIBUS PA instruments.



Additional Resources

Resource	Description
PROFIBUS PA Field Instruments	
Proline Promass 80E, 83E Technical Information, publication TI061D/06/en	Specifications and details of the Promass 83E flowmeter.
Proline Promass 83 Operating Instructions (PROFIBUS DP/PA), publication BA063D/06/en	How to install, wire, configure, and operate a Promass 83 flowmeter.
www.products.endress.com/profibus-gsd	Download GSD file for field instrument.
http://www.products.endress.com/flow	Information about Endress+Hauser flowmeters
Control System Components	
ControlLogix Controllers Installation Instructions, publication 1756-IN101	How to install and configure a ControlLogix controller.
ControlLogix Controllers User Manual, publication 1756-UM001	How to configure, operate, and maintain a ControlLogix controller.
HIPROM EN2PAR User Manual	Describes the functionality, installation, configuration, and operation of the EN2PAR module.
http://www.hiprom.com	Download firmware updates and updated documentation.
Operator Components	
Add-On Instructions and Faceplates for Visualizing PROFIBUS PA Instrument Data in FactoryTalk View SE, Knowledgebase document (Login required. Please contact your sales representative.)	How to implement the PROFIBUS PA Add-On-Instruction in controller logic to work with the FactoryTalk View faceplates for PROFIBUS PA instruments.
FactoryTalk View Site Edition User's Guide, publication VIEWSE-UM006	How to design, develop, and deploy FactoryTalk View SE applications.
Faceplates, Add-On Instructions, project files, etc. (Login required. Please contact your sales representative.	Download AOIs, Faceplates and Global Object graphics, and project files.
www.products.endress.com/fieldcare	Information about FieldCare Asset Management software.
www.products.endress.com/dtm-download	Information about field instrument DTMs.
Process Control Information	
Integrated Architecture for Process Control System Recommendations Manual, publication PROCES-RM001	Process system recommendations that organize Rockwell Automation products functionally as system elements, which can then be applied in proven, scalable configurations for continuous and batch control.
http://www.rockwellautomation.com/process	Information about Rockwell Automation process control and Integration Documents.
http://literature.rockwellautomation.com	Available Rockwell Automation publications, including Integration Documents.
http://www.endress.com	Information about Endress+Hauser field instruments.

Rockwell Automation Support

Rockwell Automation provides technical information on the Web to assist you in using its products. At http://support.rockwellautomation.com, you can find technical manuals, a KnowledgeBase of FAQs, technical and application notes, sample code and links to software service packs, and a MySupport feature that you can customize to make the best use of these tools.

For an additional level of technical phone support for installation, configuration, and troubleshooting, we offer TechConnect support programs. For more information, contact your local distributor or Rockwell Automation representative, or visit http://support.rockwellautomation.com.

Endress+Hauser Support

Please refer to your local Endress+Hauser Sales Center for precise information regarding the service support available in your area or visit http://www.endress.com.

Installation Assistance

If you experience a problem within the first 24 hours of installation, please review the information that's contained in this manual. You can also contact a special Customer Support number for initial help in getting your product up and running.

United States	1.440.646.3434 Monday – Friday, 8 a.m. – 5 p.m. EST
Outside United States	Please contact your local Rockwell Automation representative for any technical support issues.

New Product Satisfaction Return

Rockwell Automation tests all of its products to ensure that they are fully operational when shipped from the manufacturing facility. However, if your product is not functioning and needs to be returned, follow these procedures.

United States	Contact your distributor. You must provide a Customer Support case number (call the phone number above to obtain one) to your distributor in order to complete the return process.
Outside United States	Please contact your local Rockwell Automation representative for the return procedure.

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Endress+Hauser is trusted by more than 100,000 customers to make their processes safe, efficient and environmentally friendly. We offer a range of measurement products, including level, flow, pressure, temperature, analytical and complete engineered solutions designed to help customers acquire, transmit, control and record process information needed to manage operations in a safe, reliable and profitable manner.

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Rockwell Automation, Inc. (NYSE: ROK) is a leading global provider of industrial automation power, control and information solutions that help manufacturers achieve a competitive advantage in their businesses. The company brings together leading global brands in industrial automation which include Allen-Bradley controls and services and Rockwell Software factory management software.

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